3Com® Telecommuting Module User Manual

Version 4.3

3Com® Telecommuting Module User Manual: Version 4.3

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Part I. Introduction to 3Com VCX IP Telecommuting Module

Chapter 1. Introduction to 3Com VCX IP Telecommuting Module

Some of the functions of 3Com VCX IP Telecommuting Module are:

- SIP proxy: Forwarding of SIP requests.
- Protection against such attacks as address spoofing.
- Logging/alarm locally on the Telecommuting Module, via email and/or via syslog.
- Managing several logical/directly-connected networks and several network connections/physical networks.
- Administration of the Telecommuting Module through a web browser using http or https.
- Failover - connect two Telecommuting Modules in parallel; one handles traffic and the other acts as a hot standby.
- STUN server and Remote SIP Connectivity for SIP clients behind NAT boxes which are not SIP aware (using the Remote SIP Connectivity module).

Note that some of the functions mentioned here are only available if the corresponding extension module has been installed.

What is a Telecommuting Module?

A Telecommuting Module is a device which processes traffic under the SIP protocol (see RFC 3261). The Telecommuting Module receives SIP requests, processes them according to the rules you have set up, and forwards them to the receiver.

The Telecommuting Module connects to an existing enterprise firewall through a DMZ port, enabling the transmission of SIP-based communications without affecting firewall security. SIP messages are then routed through the firewall to the private IP addresses of authorized users on the internal network.

The Telecommuting Module can also be used as an extra gateway to the internal network without connecting to the firewall, transmitting only SIP-based communications.

Configuration alternatives

The 3Com VCX IP Telecommuting Module can be connected to your network in three different ways, depending on your needs.

Note that the interface which should receive traffic from the outside must have a public IP address (no NAT), regardless of which **Telecommuting Module Type** was selected. For a DMZ or DMZ/LAN type, this means that the interface connected to the DMZ of the firewall must have a public IP address.

DMZ Configuration

Using this configuration, the Telecommuting Module is located on the DMZ of your firewall, and connected to it with only one interface. The SIP traffic finds its way to the Telecommuting Module using DNS or by setting the Telecommuting Module as an outbound proxy on the clients.

This is the most secure configuration, since all traffic goes through both your firewall and your Telecommuting Module. It is also the most flexible, since all networks connected to any of your firewall’s interfaces can be SIP-enabled.

The drawback is that the SIP traffic will pass the firewall twice, which can decrease performance.

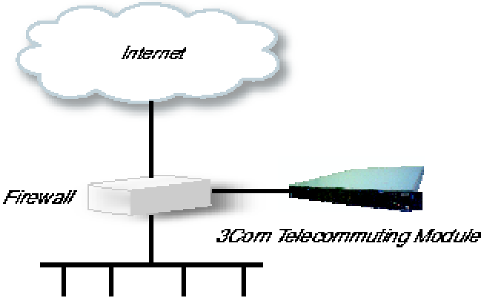


Fig 1. Telecommuting Module in DMZ configuration.

DMZ/LAN Configuration

Using this configuration, the Telecommuting Module is located on the DMZ of your firewall, and connected to it with one of the interfaces. The other interface is connected to your internal network. The Telecommuting Module can handle several networks on the internal interface even if they are hidden behind routers. No networks on other interfaces on the firewall can be handled.

This configuration is used to enhance the data throughput, since the traffic only needs to pass your firewall once.

This configuration can only support one local network.

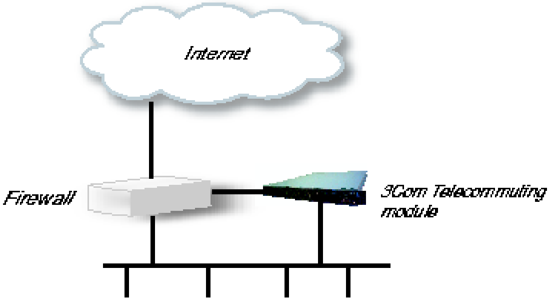


Fig 2. Telecommuting Module in DMZ/LAN configuration.

Standalone Configuration

Using this configuration, the Telecommuting Module is connected to your internal network on one interface and the outside world on the other.

Use this configuration only if your firewall lacks a DMZ interface, or for some other reason cannot be configured for the DMZ or DMZ/LAN alternatives.

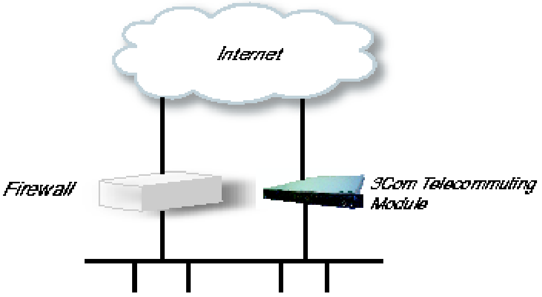


Fig 3. Telecommuting Module in Standalone configuration.

Quick guide to 3Com VCX IP Telecommuting Module installation

3Com VCX IP Telecommuting Module is easy to install:

- Select an IP address for the Telecommuting Module on your network.
- The network interfaces are marked with 1 and 2. These numbers correspond to the physical interfaces *eth0* and *eth1* respectively, the latter which should be use in the installation program.
- Plug in the power cord and turn on the Telecommuting Module.
- Wait while the Telecommuting Module boots up.
- Connect the network cables to the network interfaces.
- Find out the MAC address of the Telecommuting Module's Network Interface 1 (printed on the Telecommuting Module label).
- Add a static entry in your local ARP table consisting of the Telecommuting Module's MAC address and the IP address it should have on Network Interface 1.

  This is how to add a static ARP entry if you use a Windows computer:

  Run the command *command* (or cmd).

  In the Command window, enter the command **arp -s `ipaddress` `macaddress`** where *ipaddress* is the new IP address for Network Interface 1, and *macaddress* is the MAC address printed on the Telecommuting Module, but with all colons (:) replaced with dashes (-).

- Ping this IP address to give the Telecommuting Module its new IP address. You should receive a ping reply if the address distribution was successful.
- Direct your web browser to the IP address of the Telecommuting Module. You will be prompted to set a password for the Telecommuting Module *admin* user.
- Now you can see the top page of 3Com VCX IP Telecommuting Module. Click on the **Telecommuting Module Type** link and select the configuration for your Telecommuting Module. The types are described on the web page.
- Go to the **Network Interface 1** page and enter the necessary configuration. See also the Interface section. Note that the Telecommuting Module must have at least one IP address which can be reached from the Internet.
- If one of the Telecommuting Module Types DMZ/LAN or Standalone was chosen, move on to the **Network Interface 2** page and give the Telecommuting Module at least one IP address on this interface and state the networks connected to the interface. See also the Interface section.
- Go to the **Networks and Computers** page. Define the networks that will send and receive SIP traffic using the Telecommuting Module. Usually, you need at least one network per interface of the firewall connected to the Telecommuting Module (or, for the Standalone type, per interface of the Telecommuting Module). Some computers should be handled separately, and they therefore need their own networks. See also the Networks and Computers section.
- Go to the **Basic Configuration** page under **Basic Configuration** and enter a **Default gateway** and a **DNS server**. See also the Basic Configuration section.
- Go to the **Access Control** page and make settings for the configuration of the Telecommuting Module. See also the Access Control section.
- Go to the **Surroundings** page (for the DMZ Telecommuting Module Type) and state the networks connected to the *firewall*. See also the Surroundings section in chapter 7, Network Configuration.
- Go to **Basic** under **SIP Services** and turn the **SIP module** on. See also the Basic section.
- Go to the **Interoperability** page. Turn **Preserve username** and **SIP URL encryption** on.
- If you use a dialing domain which looks like an IP address, enter the dialing domain in the **Translation exceptions** table. See also the Interoperability section.
- For this type of dialing domain, you also need to go to the **Routing** page. Enter the dialing domain in the **DNS Override For SIP Requests** table and state the IP address of the SIP server(s) to handle the domain. See also the Routing section.
- Go to the **Save/Load Configuration** page under. Select **Apply configuration**. Now you can test your new configuration and save it permanently if you are satisfied with it. If the configuration is not satisfactory, select **Revert** or restart the Telecommuting Module. The old configuration will remain.

When the Telecommuting Module is configured, the firewall connected to it must also be reconfigured (for the DMZ and DMZ/LAN Telecommuting Module Types).

- Allow UDP and TCP traffic in the port interval used for media streams by the Telecommuting Module, and port 5060. This traffic must be allowed to all networks which should be reached by SIP traffic.

See also chapter 14, Firewall and Client Configuration, for information on configuring the firewall and the SIP clients, and chapter 4, How To Configure SIP, for Telecommuting Module configuration examples.

Before you start

You could do a rough sketch of your network to make the configuration simpler. Things to think of:

- Which IP addresses will the Telecommuting Module interfaces use? You can have more than one IP network on one interface, each requiring a separate IP address for the Telecommuting Module.
- Which series of IP addresses will be used on the networks connected to the different interfaces?
- Are there networks behind routers?
- What is the default gateway for the Telecommuting Module?

About settings in 3Com VCX IP Telecommuting Module

3Com VCX IP Telecommuting Module uses two sets of Telecommuting Module configurations: preliminary and permanent configuration. The permanent configuration is what is used in the active Telecommuting Module. The preliminary configuration is where you change and set the configuration. See chapter 3, Configuring 3Com VCX IP Telecommuting Module, for instructions.

The changes you make in the preliminary configuration are not stored in the permanent configuration until you click on **Apply configuration** on the **Save/Load Configuration** page under **Administration**.

The password configuration and time setting are the exceptions to this rule; they are saved immediately. Change the administrator passwords and create more administrator users on the **User Administration** page under **Administration**.

3Com VCX IP Telecommuting Module displays serious errors in red, e.g., if mandatory information is not entered. Blank fields are shown in red. Fields that you correct remain red until you select **Save**, **Add new rows** or update the page in some other way.

If you have a web connection with the Telecommuting Module that is inactive for 10 minutes, it will ask for a password again.

Always log out from the Telecommuting Module administration interface when you are not using it. Press the **Log out** button on the left to log out.

The terms used in the book are explained in appendix D, Definitions of Terms.

For a general description of how to configure and administer the Telecommuting Module, see chapter 3, Configuring 3Com VCX IP Telecommuting Module.

Chapter 2. Installing 3Com VCX IP Telecommuting Module

Installation

There are three ways to install an 3Com VCX IP Telecommuting Module: using a serial cable, using a diskette or perform a magic ping.

Installation with a serial cable or a diskette requires being at the same place as the Telecommuting Module, but will give more options for the start configuration.

Installation with magic ping does not require being on the same place as the Telecommuting Module (but the computer has to be connected to the same logical network as the Telecommuting Module), but restricts the start configuration.

Installation with magic ping

You can use the magic ping to set an IP address for the Telecommuting Module. This is how to perform a magic ping:

- Plug in the power cord and turn the Telecommuting Module on.
- Wait while the Telecommuting Module boots up.
- Connect the network cables to the network interfaces.
- Find out the MAC address of the Telecommuting Module (printed on the back of the Telecommuting Module). This is the MAC address of **Network Interface 1**.
- Add a static entry in your local ARP table consisting of the Telecommuting Module’s MAC address and the IP address it should have on Network Interface 1.

  This is how to add a static ARP entry if you use a Windows computer:

  Run the command *command* (or cmd).

  In the Command window, enter the command arp -s *ipaddress macaddress* where *ipaddress* is the new IP address for the Network Interface 1 interface, and *macaddress* is the MAC address printed on the Telecommuting Module, but with all colons (:) replaced with dashes (-).

- Ping this IP address to give the Telecommuting Module its new IP address. You should receive a ping reply if the address distribution was successful.
- Configure the rest through a web browser.

- Plug in the power cord and turn the Telecommuting Module on.
- Wait while the Telecommuting Module boots up.
- Connect the network cables to the network interfaces.
- Find out the MAC address of the Telecommuting Module (printed on the back of the Telecommuting Module). This is the MAC address of **Network Interface 1**.
- Add a static entry in your local ARP table consisting of the Telecommuting Module’s MAC address and the IP address it should have on Network Interface 1.

  This is how to add a static ARP entry if you use a Windows computer:

  Run the command *command* (or cmd).

  In the Command window, enter the command arp -s *ipaddress macaddress* where *ipaddress* is the new IP address for the Network Interface 1 interface, and *macaddress* is the MAC address printed on the Telecommuting Module, but with all colons (:) replaced with dashes (-).

- Ping this IP address to give the Telecommuting Module its new IP address. You should receive a ping reply if the address distribution was successful.
- Configure the rest through a web browser.

Installation with a serial cable

These steps are performed when installing with a serial cable:

- Connect the Telecommuting Module to your workstation with a null modem serial cable.
- Plug in the power cord and turn the Telecommuting Module on.
- Wait while the Telecommuting Module boots up.
- Log on from your workstation.
- Run the installation program (see following instructions).
- Connect the network cables to the network interfaces.
- Configure the rest through a web browser.

Connect the Telecommuting Module to your workstation with a null modem serial cable, plug in the power cord and turn the Telecommuting Module on. You will have to wait a few minutes while it boots up.

- If you use a Windows workstation, connect like this: Start *Hyperterm*. A Location dialogue will show, asking for your telephone number and area. Click Cancel followed by Yes. Then you will be asked to make a new connection. Type a name for this connection, select an icon and click OK. The Location dialogue will show again, so click Cancel followed by Yes.

  Now you can select Connect using COM1 and click OK. A Port settings dialogue will show, where you select 19200 as Bits per second. Use the default configuration for all other settings. Click OK and wait for a login prompt. (In some cases you have to press Return to get the login prompt.)

- If you use a Linux workstation, connect like this: Make sure that there is a symbolic link named /dev/modem which points to the serial port you connected the Telecommuting Module to. Connect using *minicom* with the bit rate 19200 bits/s, and wait for a login prompt.

Log on as the user *admin*. The first time you log on, no password is required. You set the password when you run the installation script, which starts automatically when you have logged on.

Each network interface is marked with a name (1 and 2), which corresponds to a tab under **Network**. All eth interfaces belong to ethernet cards and should only be connected using ethernet cables.

Decide which computer(s) are allowed to configure 3Com VCX IP Telecommuting Module and enter the name of the network interface to which they are connected, for example, Network Interface 1. You must use the physical device name (eth0 and eth1).

Enter the IP address of the Telecommuting Module on this interface and the network mask for the network.

A network mask can be written in two ways in 3Com VCX IP Telecommuting Module:

- The first looks just like an IP address, for example 255.255.192.0 or 255.255.254.0.
- The other way is as a number between 0 and 32. An IP address has 32 bits, where the number of the network mask indicates how many bits are used in the network’s addresses. The rest of the bits identifies the computer on the network.

Now, you can select to deactivate any network interfaces. Select y to deactivate all interfaces but the one you just configured. The remaining network interfaces can be activated later when you complete the configuration via the web interface from your work station. This only applies to interfaces which was previously active; you can’t activate interfaces with this setting.

Now enter the computer or computers from which the Telecommuting Module may be configured (the configuration computers).

Then enter a password for the Telecommuting Module. This is the password you use in your web browser to access and change the Telecommuting Module’s configuration. Finally, you can reset all other configuration if you want to.

Following is a sample run of the installation program.

```
  3Com VCX IP Telecommuting Module Administration
    1. Basic configuration
    2. Save/Load configuration
    3. Become a failover team member
    4. Leave failover team and become standalone
    5. Wipe email logs
    6. Set password
    q. Exit admin
    ==>
```

Select 1 to install your 3Com VCX IP Telecommuting Module.

```
Basic unit installation program version 4.3

Press return to keep the default value

Network configuration inside:
 Physical device name[eth0]:
 IP address [0.0.0.0]: 10.47.2.242
 Netmask/bits [255.255.255.0]: 255.255.0.0
 Deactivate other interfaces? (y/n) [n]

Computers from which configuration is allowed:

You can select either a single computer or a network.

Configure from a single computer? (y/n) [y]
```

If you choose to allow only one computer to configure the Telecommuting Module, you are asked for the IP address (the mask is set automatically).

```
IP address [0.0.0.0]: 10.47.2.240
```

If this IP address is not on the same network as the IP address of the Telecommuting Module, you are asked for the router. Enter the IP address of the router on the network where the Telecommuting Module is connected. Then enter the network address and mask of the network containing the *configuring computer*.

```
Static routing:
The computer allowed to configure from is not on a network local to
this unit. You must configure a static route to it. Give
the IP address of the router on the network the unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

You can choose to allow several computers to configure the Telecommuting Module, by answering no to the question:

```
Configure from a single computer? (y/n) [y] n
```

The installation program then asks for the network number. The network number is the lowest IP address in the series of numbers that includes the configuration computers (see chapter 3, Configuring 3Com VCX IP

Telecommuting Module). The network mask determines the number of computers that can act as configuration computers.

```
Network number [0.0.0.0]: 10.47.2.0
Netmask/bits [255.255.255.0]: 255.255.255.0
```

If the network or partial network is not directly connected to the Telecommuting Module, you must enter the IP address of the router leading to that network. Then enter the network's address and mask.

```
Static routing:
The network allowed to configure from is not on a network local to this
unit. You must configure a static route to it. Give the
IP address of the router on the network this unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

Then enter a password.

```
Password []:
```

Finally, you are asked if you want to reset other configuration.

```
Other configuration
Do you want to reset the rest of the configuration? (y/n) [n]
```

If you answer `n`, nothing is removed. If you answer `y`, you have three alternatives to select from:

1. Clear as little as possible. This is the alternative that is used if you answer `n` to the question above. Both the preliminary and the permanent configurations will be updated with the configuration specified above.
2. Revert to the factory configuration and then apply the configuration specified above. This will affect the permanent but not the preliminary configuration.
3. Revert to the factory configuration and empty all logs and then apply the configuration specified above. Both the preliminary and the permanent configurations will be affected.

Select the update mode, which is what you want to remove.

```
Update mode (1-3) [1]:
```

All configuration is now complete. The installation program shows the configuration and asks if it is correct.

yes saves the configuration.

no runs the installation program over again.

abort ends the installation program without saving.

```
You have now entered the following configuration

Network configuration inside:
 Physical device name: eth0
 IP address: 192.168.150.2
 Netmask: 255.255.255.0
 Deactivate other interfaces: no

Computer allowed to configure from:
 IP address: 192.168.128.3

Password: eeyore

The rest of the configuration is kept.

Is this configuration correct (yes/no/abort)? yes
```

Now, finish configuration of the Telecommuting Module from the computer/computers specified in the installation program.

Installation with a diskette

These steps are performed when installing with a diskette:

- Select an IP address and store it on the installation diskette as described below.
- Insert the installation diskette into the Telecommuting Module’s floppy drive.
- Plug in the power cord and turn the Telecommuting Module on.
- Connect the network cables to the network interfaces.
- Wait while the Telecommuting Module boots up.
- Configure the rest through a web browser.

You must first insert the diskette into your PC. If the PC is running Windows, open a Command window and run the **finst-en** script from the diskette. If the PC is running Linux, mount the diskette, change directory to the mounted one, and run the **finst-en** script.

Decide which computer(s) are allowed to configure 3Com VCX IP Telecommuting Module and enter the name of the network interface to which they are connected, for example, Network Interface 1. You must use the physical device name (eth0 and eth1).

Enter the IP address of the Telecommuting Module on this interface and the network mask for the network.

A network mask can be written in two ways in 3Com VCX IP Telecommuting Module:

- The first looks just like an IP address, for example 255.255.192.0 or 255.255.254.0.
- The other way is as a number between 0 and 32. An IP address has 32 bits, where the number of the network mask indicates how many bits are used in the network’s addresses. The rest of the bits identifies the computer on the network.

Now, you can select to deactivate any network interfaces. Select y to deactivate all interfaces but the one you just configured. The remaining network interfaces can be activated later when you complete the configuration via the web interface from your work station. This only applies to interfaces which was previously active; you can’t activate interfaces with this setting.

Now enter the computer or computers from which the Telecommuting Module may be configured (the configuration computers).

Then enter a password for the Telecommuting Module. This is the password you use in your web browser to access and change the Telecommuting Module’s configuration. Finally, you can reset all other configuration if you want to.

Following is a sample run of the installation program on the diskette.

```
Basic unit installation program version 4.3

Press return to keep the default value

Network configuration inside:
 Physical device name[eth0]:
 IP address [0.0.0.0]: 10.47.2.242
 Netmask/bits [255.255.255.0]: 255.255.0.0
 Deactivate other interfaces? (y/n) [n]

Computers from which configuration is allowed:

You can select either a single computer or a network.

Configure from a single computer? (y/n) [y]
```

If you choose to allow only one computer to configure the Telecommuting Module, you are asked for the IP address (the netmask is set automatically).

```
IP address [0.0.0.0]: 10.47.2.240
```

If this IP address is not on the same network as the inside of the Telecommuting Module, you are asked for the router. Enter the IP address of the router on the network where the Telecommuting Module is connected. Now enter the network address and mask of the network containing the configuring computer.

```
Static routing:
The computer allowed to configure from is not on a network local to
this unit. You must configure a static route to it. Give
the IP address of the router on the network the unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

You can choose to allow several computers to configure the Telecommuting Module, by answering no to the question:

```
Configure from a single computer? (y/n) [y] n
```

The installation program then asks for the network number. The network number is the lowest IP address in the series of numbers that includes the configuration computers (see chapter 3, Configuring 3Com VCX IP Telecommuting Module). The network mask determines the number of computers that can act as configuration computers.

```
Network number [0.0.0.0]: 10.47.2.0
Netmask/bits [255.255.255.0]: 255.255.255.0
```

If the network or partial network is not directly connected to the Telecommuting Module, you must enter the IP address of the router leading to that network. Then enter the network's address and mask.

```
Static routing:
The network allowed to configure from is not on a network local to this
unit. You must configure a static route to it. Give the
IP address of the router on the network this unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

Then enter a password.

```
Password []:
```

Finally, you are asked if you want to reset other configuration.

```
Other configuration
Do you want to reset the rest of the configuration? (y/n) [n]
```

If you answer `n`, nothing is removed. If you answer `y`, you have three alternatives to select from:

1. Clear as little as possible. This is the alternative that is used if you answer `n` to the question above. Both the preliminary and the permanent configurations will be updated with the configuration specified above.
2. Revert to the factory configuration and then apply the configuration specified above. This will affect the permanent but not the preliminary configuration.
3. Revert to the factory configuration and empty all logs and then apply the configuration specified above. Both the preliminary and the permanent configurations will be affected.

Select the update mode, which is what you want to remove.

```
Update mode (1-3) [1]:
```

All configuration is now complete. The installation program shows the configuration and asks if it is correct.

yes saves the configuration.

no runs the installation program over again.

abort ends the installation program without saving.

Now, eject the diskette from your PC and insert it into the Telecommuting Module's floppy drive. Then power up the Telecommuting Module and wait for it to boot. Then, finish configuration of the Telecommuting Module from the computer/computers specified in the installation program.

> Note that the diskette contains a command to erase certain parts of the configuration during boot when the diskette is inserted. Make sure to eject it once the Telecommuting Module has booted up to avoid future loss of data.

If you happen to forget the administrator password for the Telecommuting Module, you can insert the diskette into the Telecommuting Module again and boot it. Note that if you selected anything but 1 as the update mode, you will lose configuration when doing this.

Turning off a Telecommuting Module

Backup the Telecommuting Module configuration (just in case something should happen). You do this on the **Save/Load Configuration** page under **Administration**. Once this is done, just turn the computer off. The computer that runs 3Com VCX IP Telecommuting Module is specially designed so that you can switch it off without causing any problems in the file structure.

Remember to lock up the Telecommuting Module

The Telecommuting Module is a computer with special software, and must be protected from unauthorized physical access just as other computers performing critical tasks. A locked up Telecommuting Module protects against:

- connecting to the console
- connecting a keyboard and monitor
- changing the administrator password using the installation diskette.
- changing BIOS configuration to allow the Telecommuting Module to be booted from a diskette

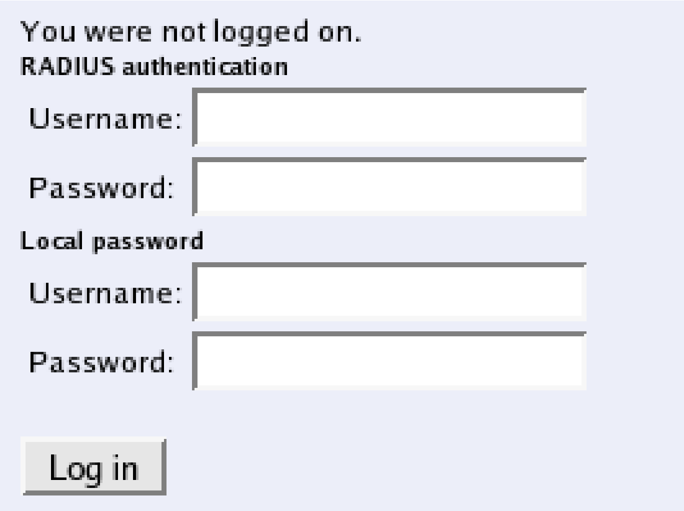
For more information about the necessary configuration, see chapter 3, Configuring 3Com VCX IP Telecommuting Module.

Chapter 3. Configuring 3Com VCX IP Telecommuting Module

You connect to your 3Com VCX IP Telecommuting Module by entering its name or IP address in the Location box of your web browser.

Logging on

Before you can configure the Telecommuting Module, you must enter your administrator username and password or RADIUS username and password. The *admin* user is predefined with complete administration privileges.



You were not logged on.

RADIUS authentication

Username:

Password:

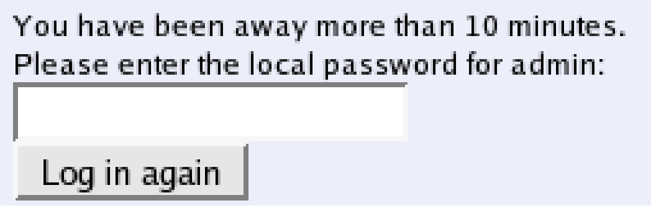
Local password

Username:

Password:

Log on again

If you have a web connection for Telecommuting Module configuration that is inactive for more than 10 minutes, you must enter the password again and click on one of the buttons **Keep changes below** and **Abandon changes below**.



You have been away more than 10 minutes.

Please enter the local password for admin:

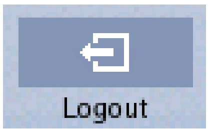
On all pages where changes have been made, the two buttons **Keep changes below** and **Abandon changes below** will be shown when you log on again. **Keep changes below** connects you to the Telecommuting Module and stores the preliminary configuration you have changed. **Abandon changes below** connects you to the Telecommuting Module and discards the changes you have made on this page.

On pages where nothing has been changed, the **Log in again** button is displayed. Enter the password and click on the button to re-connect to the Telecommuting Module.

The Telecommuting Module’s encryption key is changed every 24 hours. If you have a web connection for Telecommuting Module configuration when this happens, you must enter the password again. This works in the same way as when your connection has been inactive for more than 10 minutes (see above).

Log out

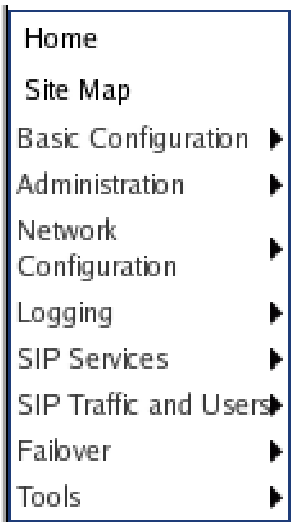
When you have finished looking at or adding settings, you should log out from the Telecommuting Module. Below the menu there is a Log out button which will end your session.



Note: You will not be logged out automatically just by directing your web browser to a different web address. You should log out using the button to make the browser forget your username and password.

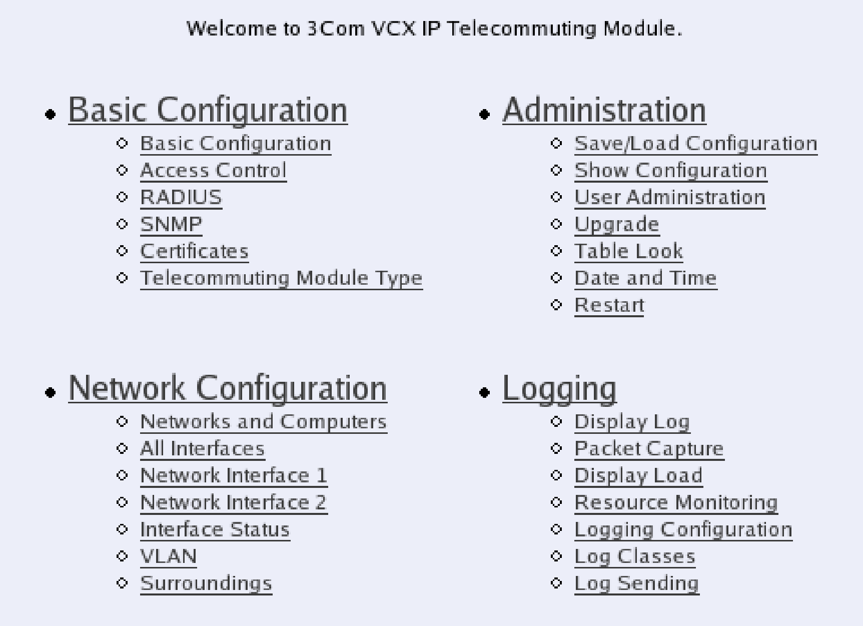
Navigation

There is a menu for quick navigation to all configuration pages. On top of the page, you also see the name of the Telecommuting Module.



Site Map

The Site Map is the first page displayed when you have logged on the Telecommuting Module. From this page, you can access **Basic Configuration**, **Administration**, **Network**, **Logging**, **SIP Services**, **SIP Traffic**, and **Failover**. You can also access a special page by the text links below each category name.



Welcome to 3Com VCX IP Telecommuting Module.

- Basic Configuration
  - Basic Configuration
  - Access Control
  - RADIUS
  - SNMP
  - Certificates
  - Telecommuting Module Type
- Administration
  - Save/Load Configuration
  - Show Configuration
  - User Administration
  - Upgrade
  - Table Look
  - Date and Time
  - Restart
- Network Configuration
  - Networks and Computers
  - All Interfaces
  - Network Interface 1
  - Network Interface 2
  - Interface Status
  - VLAN
  - Surroundings
- Logging
  - Display Log
  - Packet Capture
  - Display Load
  - Resource Monitoring
  - Logging Configuration
  - Log Classes
  - Log Sending

Basic Configuration

Under **Basic Configuration**, select Telecommuting Module Type and the name of the Telecommuting Module. You also enter IP addresses for gateway and DNS server. Here you also configure if the Telecommuting Module should interact with a RADIUS or an SNMP server.

Administration

Under **Administration**, you store or load a configuration. You can also test your configuration to see if it works the way you planned, upgrade or reboot your Telecommuting Module, set date and time, and configure administration users and passwords.

Network

Under **Network**, you enter the Telecommuting Module’s IP address, the routing for the different networks, and define groups of IP addresses which are used in various settings of the Telecommuting Module.

Logging

Under **Logging**, you specify the type of traffic you want to log/alarm and how it should be logged. You can also view the logs and the traffic load here.

SIP Services

Under **SIP Services**, you configure interoperability settings and Remote SIP Connectivity.

SIP Traffic

Under **SIP Traffic**, you configure the SIP traffic through the Telecommuting Module. You can also view current pass-through registrations and SIP sessions.

Failover

Under **Failover**, you configure the failover team and its dedicated network. You can also view the status of the other team member.

Tools

Under **Tools**, you find handy tools for troubleshooting. The Telecommuting Module features a packet capturer which produces pcap trace files.

Home

Under **Home**, you get basic information about the Telecommuting Module’s serial number, software version, installed licenses and patches, and links to more information.

Overview of configuration

Start by installing the Telecommuting Module as described in chapter 2, Installing 3Com VCX IP Telecommuting Module.

Select the **Telecommuting Module Type**.

The Telecommuting Module must have at least one IP address for each network card to work. A routing, or path, for each network must also be set on the interface pages under **Network**. Go to the **Networks and Computers** page and enter the networks which are using the Telecommuting Module. For a DMZ Telecommuting Module, also state the Telecommuting Module’s **Surroundings**.

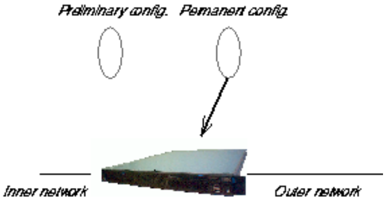
Then move on to **SIP Services** and turn the SIP module on.

Use logging to analyze the traffic that passes through the Telecommuting Module. Choose to log locally on the Telecommuting Module, send logs to a syslog server or send them by email to an email address. Specify the type of logging wanted under **Logging**. This is also where the logs of traffic through the Telecommuting Module are viewed.

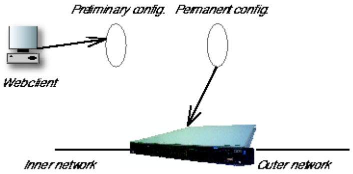
When the configuration is complete, apply it. Go to **Save/Load Configuration** under **Administration**. Select **Apply configuration**. Now the new configuration is tested. Save it permanently if it works satisfactorily. If the configuration is not satisfactory, select **Revert** or restart the Telecommuting Module. The old configuration will remain.

Preliminary and permanent configuration

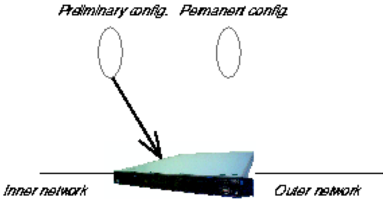
3Com VCX IP Telecommuting Module has two kinds of settings: preliminary and permanent configuration. When the Telecommuting Module is running, the permanent configuration controls the Telecommuting Module functions.



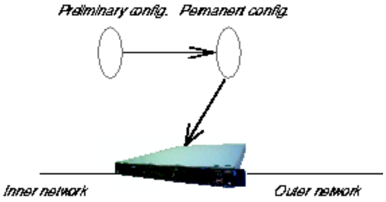
When you configure your Telecommuting Module, you are working with the preliminary configuration. As you change the preliminary configuration, the permanent configuration continues to control the Telecommuting Module functions.



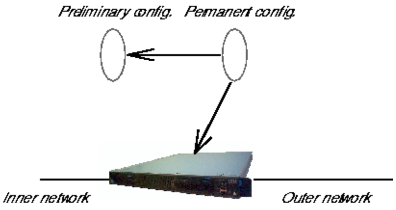
When you are done with the preliminary configuration, you can test it by selecting **Apply configuration** on the **Save/Load Configuration** page. Now the preliminary configuration controls the Telecommuting Module functions.



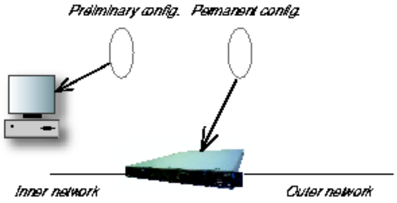
When you are satisfied with the preliminary configuration, you can apply it permanently, which copies the preliminary configuration to the permanent configuration. Now the new configuration controls the Telecommuting Module functions.



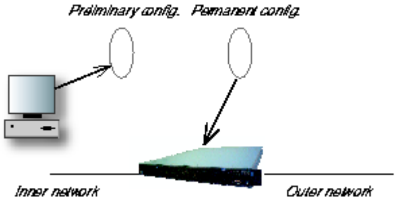
You can also copy the permanent configuration to the preliminary configuration. This does not affect the permanent configuration or the Telecommuting Module functions, which are still being run by the permanent configuration. You do this by selecting **Abort all edits** on the **Save/Load Configuration** page under **Administration**. This will discard all changes made in the preliminary configuration since last time you applied a configuration by pressing **Save configuration**.



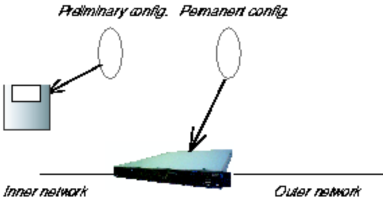
You can save the preliminary configuration to a file on your work station (the computer that is running your web browser). Select **Save to local file** on the **Save/Load Configuration** page.



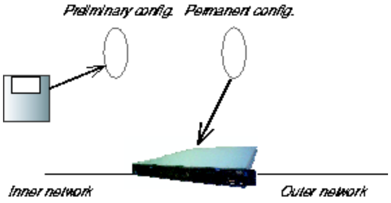
A saved configuration can be loaded to the preliminary configuration. Use Browse to search your local computer or enter path and file name in the box. When you have chosen the file you want to load, select **Load from local file** on the **Save/Load Configuration** page.



You can save the preliminary configuration to a diskette. Insert a formatted diskette in the Telecommuting Module's floppy drive and press **Save to diskette** on the **Save/Load Configuration** page.



You can load a saved configuration to the preliminary configuration. Insert a diskette containing the saved configuration in the Telecommuting Module's floppy drive and press **Load from diskette** on the **Save/Load Configuration** page.



You can perform all of these functions on the **Save/Load Configuration** page under **Administration**.

Configuring IP addresses and masks in 3Com VCX IP

Telecommuting Module

IP address

IP addresses are written as four groups of numbers with dots between them. The numbers must be between 0 and 255 (inclusive); for example, 192.168.129.17.

Mask/Bits

The binary system uses the numbers 0 and 1 to represent numbers. A binary digit is called a bit. Eight bits in the binary system can represent numbers from 0 to 255.

The mask indicates how much of the IP address is used for the network address and the computers' individual addresses, respecitvely. A mask consists of 8+8+8+8 = 32 bits. Below is a mask with 26 bits set to 1, which means that 26 bits of the IP address is locked to the network address and can't be changed within the network.

Bits	11111111	11111111	11111111	11000000
No.	255	255	255	192

In the 3Com VCX IP Telecommuting Module, a mask is written either as the number of bits that are 1 or as four numbers (0-255) with dots between the numbers.

Sometimes it can be convenient to give a group of computers a network name, such as Administration, or specify that only a handful of computers can change the Telecommuting Module configuration.

You can form a group of computers with a network name, if the computers have consecutive IP addresses. In order to do this, you must set the mask to indicate that the network group consists of those computers only. The lowest IP address for these computers tells the network number of the group.

This is easiest to explain with a simple example. You have 7 computers that will make up a group called Administration.

Take the nearest power of two above the number of computers you want to include: 2, 4, 8, 16, 32, 64, 128 or 256. Since you have 7 computers, 8 is the nearest. In this example, one IP address is free for future use.

Give the computers consecutive IP addresses. Make the first IP address a multiple of the power of two number you selected, but under 255. In the above example, this means 0, 8, 16, 24, 32, 40, 48 and so on, up to 248. You might choose to start with 136 (17 x 8). This would give the computers the IP addresses 196.176.1.136, 196.176.1.137, 196.176.1.138, 196.176.1.139, 196.176.1.140, 196.176.1.141, 196.176.1.142 and 196.176.1.143.

One of the IP addresses is free and can be used for an eighth computer in the future. You must enter the first IP address in the series, 196.176.1.136, in the **Network/IP address** field.

Now you must set the mask so that only the computers with these eight IP addresses are included in this network. Take 256 and subtract the number of IP addresses in the named network. In the example, we would have 256-8 = 248. The complete mask is 255.255.255.248.

Now you have created a group of computers (IP addresses) that you can give a single name, such as Administration.

Table of netmasks.

No. of computers	Mask	Bits
1	255.255.255.255	32
2	255.255.255.254	31
4	255.255.255.252	30
8	255.255.255.248	29
16	255.255.255.240	28
32	255.255.255.224	27
64	255.255.255.192	26
128	255.255.255.128	25
256	255.255.255.0	24

See appendix C, Lists of Reserved Ports, ICMP Types and Codes, and Internet Protocols, for more information on netmasks.

Name queries in 3Com VCX IP Telecommuting Module

A Telecommuting Module should be as independent of other computers as possible. At the same time, the person who changes the configuration of the Telecommuting Module may want to use names for the computers instead of IP addresses. Also, the SIP module needs to look up names of SIP domains. This makes it necessary to use a DNS (name server) for SIP requests.

There are three instances when 3Com VCX IP Telecommuting Module uses a DNS server:

- When it receives a SIP request for a SIP domain.

  The results of these DNS queries are stored for a short while in the Telecommuting Module.

- When you change names/IP addresses and save the page.

  The results of these DNS queries are stored in the Telecommuting Module.

- When you click on **Look up all IP addresses again**.

  The results of these DNS queries are stored in the Telecommuting Module.

3Com VCX IP Telecommuting Module is dependent of a working name server for the SIP functions. However, it doesn’t automatically look up IP addresses in the configuration, which makes it necessary to click on **Look up all IP addresses again** every time a computer changes its IP address.

When you enter IP addresses in the Telecommuting Module, they are not updated automatically. If you change a name/IP address in a row, the row is updated when you click on **Save**, switch to another page of the Telecommuting Module user interface, or click on **Look up all IP addresses again**.

Part II. How To

In the How To part, you find step-by-step descriptions for many common configurations for the Telecommuting Module. You also find references to relevant chapters in Part III, Description of 3Com VCX IP Telecommuting Module settings.

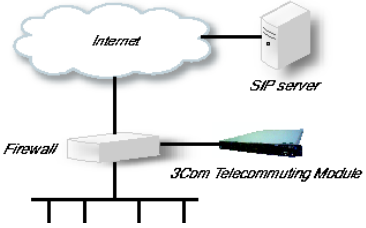
Chapter 4. How To Configure SIP

3Com VCX IP Telecommuting Module provides a lot of SIP possibilities. In this chapter, the most common SIP setups are setup with step-by-step instructions for the configuration.

DMZ Telecommuting Module, SIP server on the outside

The simplest SIP scenario is when the SIP server is managed by someone else, and the Telecommuting Module SIP function is only used to traverse NAT.

Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.

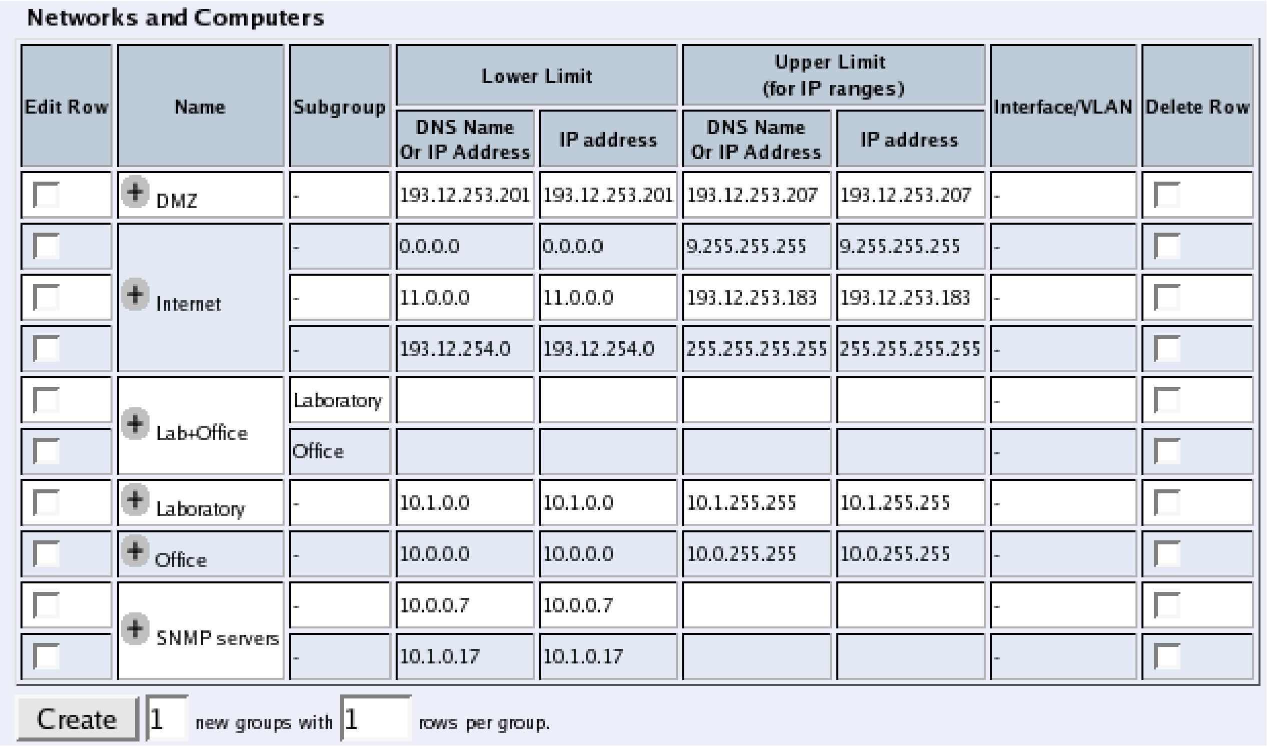


Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

Networks and Computers

The Telecommuting Module must know the network structure to be able to function properly. On the **Networks and Computers** page, you define all networks which the Telecommuting Module should serve and which are not reached through the default gateway of the *firewall*. All computers that can reach each other without having to go through the firewall connected to the Telecommuting Module should be grouped in one network.

You can also define networks and parts of networks for other configuration purposes.



Networks and Computers

Edit Row	Name	Subgroup	Lower Limit		Upper Limit (for IP ranges)		Interface/VLAN	Delete Row
			DNS Name Or IP Address	IP address	DNS Name Or IP Address	IP address		
□	+ DMZ	-	193.12.253.201	193.12.253.201	193.12.253.207	193.12.253.207	-	□
□	+ Internet	-	0.0.0.0	0.0.0.0	9.255.255.255	9.255.255.255	-	□
□		-	11.0.0.0	11.0.0.0	193.12.253.183	193.12.253.183	-	□
□		-	193.12.254.0	193.12.254.0	255.255.255.255	255.255.255.255	-	□
□	+ Lab+Office	Laboratory					-	□
□		Office					-	□
□	+ Laboratory	-	10.1.0.0	10.1.0.0	10.1.255.255	10.1.255.255	-	□
□	+ Office	-	10.0.0.0	10.0.0.0	10.0.255.255	10.0.255.255	-	□
□	+ SNMP servers	-	10.0.0.7	10.0.0.7			-	□
□		-	10.1.0.17	10.1.0.17			-	□

1 new groups with 1 rows per group.

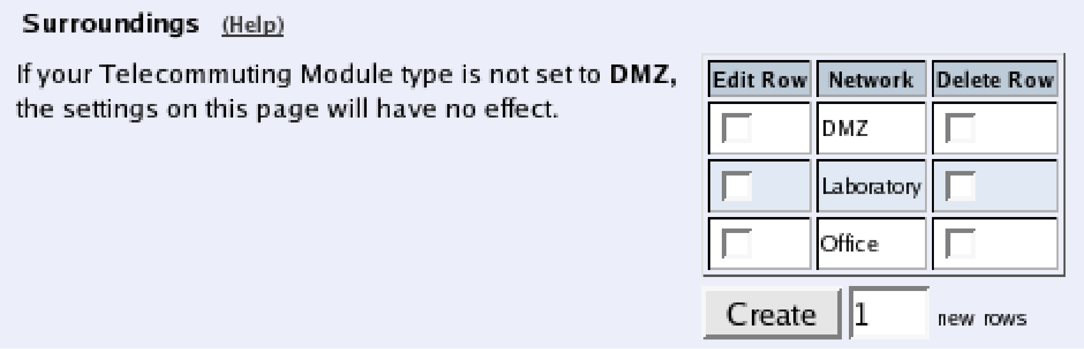
Surroundings

To make the Telecommuting Module aware of the network structure, the networks defined above should be listed on the **Surroundings** page.

One effect of this is that traffic between two users on different networks, or between one of the listed networks and a network not listed here, is NAT:ed.

Another effect is that for connections between two users on the same network, or on networks where neither is listed in Surroundings, no ports for RTP sessions will be opened, since the Telecommuting Module assumes that they are both on the same side of the firewall.

Normally, at least one network should be listed here. If no networks are listed, the Telecommuting Module will not perform NAT for any traffic.



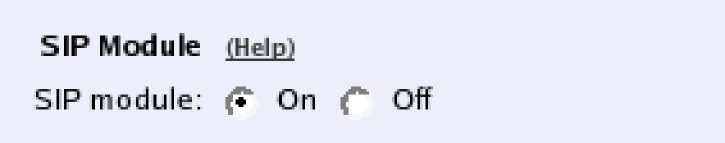
Surroundings (Help)

If your Telecommuting Module type is not set to **DMZ,** the settings on this page will have no effect.

Edit Row	Network	Delete Row
□	DMZ	□
□	Laboratory	□
□	Office	□

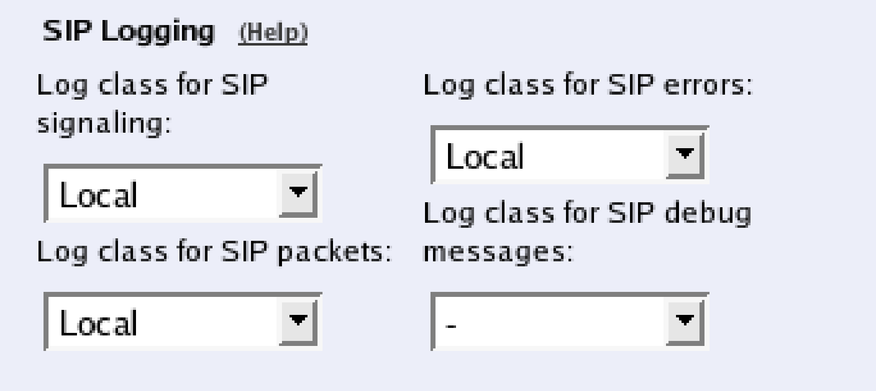
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

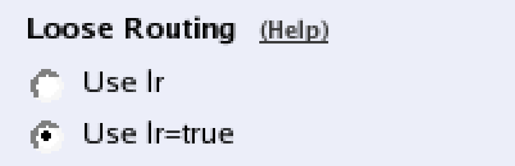
Log class for SIP errors: Local

Log class for SIP packets: Local

Log class for SIP debug messages: -

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.



Loose Routing (Help)

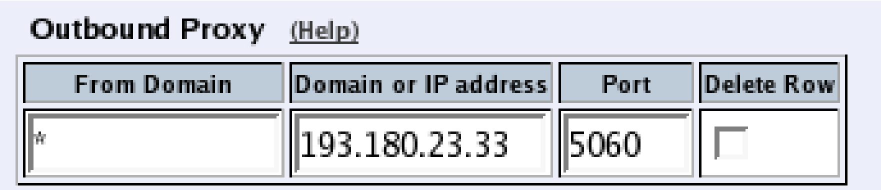
○ Use lr

● Use lr=true

Routing

On the **Routing** page, you can enter the SIP server managing your SIP domain. Enter the name or IP address of the SIP server under **Outbound proxy**.

If you enter the server name here, all SIP traffic from the inside will be directed to this server, regardless of where it is bound to.

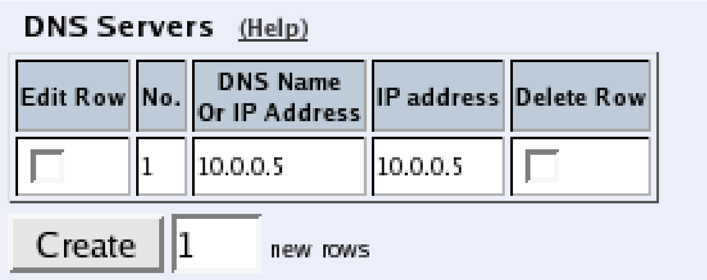


Outbound Proxy (Help)

From Domain	Domain or IP address	Port	Delete Row
*	193.180.23.33	5060	□

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.

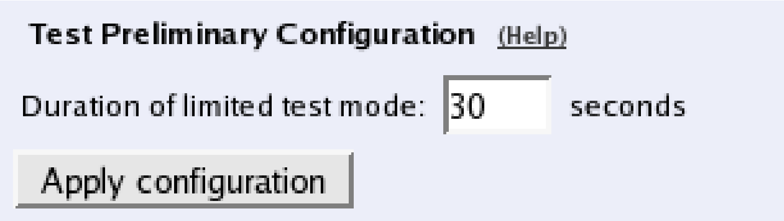


DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

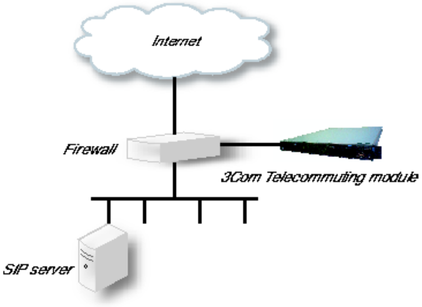
Duration of limited test mode: 30 seconds

DMZ Telecommuting Module, SIP server inside

You might instead have a SIP server of your own, located on the inside or maybe on a DMZ.

If the SIP server is located on a NATed network, DNS queries for the SIP domain should point to the Telecommuting Module, which in turn will forward the SIP traffic to the server.

Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.



Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

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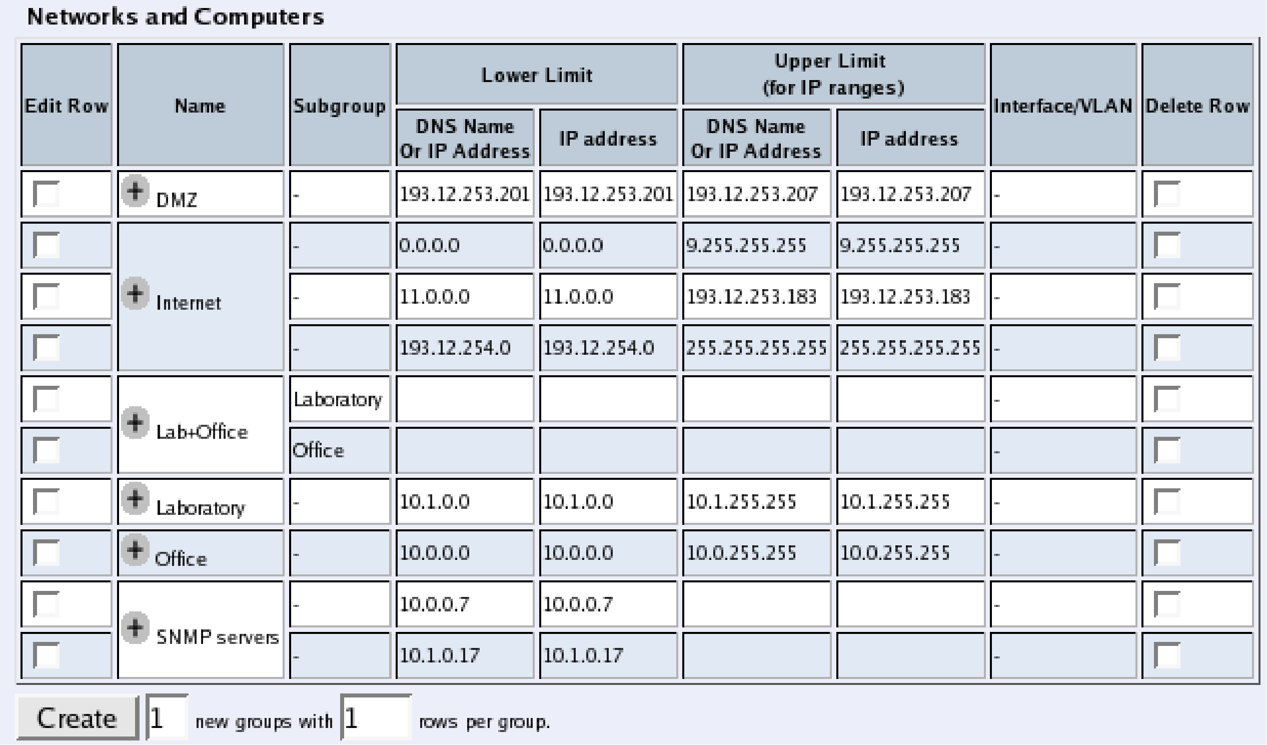

Networks and Computers

Edit Row	Name	Subgroup	Lower Limit		Upper Limit (for IP ranges)		Interface/VLAN	Delete Row
			DNS Name Or IP Address	IP address	DNS Name Or IP Address	IP address		
☐	+ DMZ	-	193.12.253.201	193.12.253.201	193.12.253.207	193.12.253.207	-	☐
☐	+ Internet	-	0.0.0.0	0.0.0.0	9.255.255.255	9.255.255.255	-	☐
☐		-	11.0.0.0	11.0.0.0	193.12.253.183	193.12.253.183	-	☐
☐		-	193.12.254.0	193.12.254.0	255.255.255.255	255.255.255.255	-	☐
☐	+ Lab+Office	Laboratory					-	☐
☐		Office					-	☐
☐	+ Laboratory	-	10.1.0.0	10.1.0.0	10.1.255.255	10.1.255.255	-	☐
☐	+ Office	-	10.0.0.0	10.0.0.0	10.0.255.255	10.0.255.255	-	☐
☐	+ SNMP servers	-	10.0.0.7	10.0.0.7			-	☐
☐		-	10.1.0.17	10.1.0.17			-	☐

1 new groups with 1 rows per group.

Surroundings

To make the Telecommuting Module aware of the network structure, the networks defined above should be listed on the **Surroundings** page.

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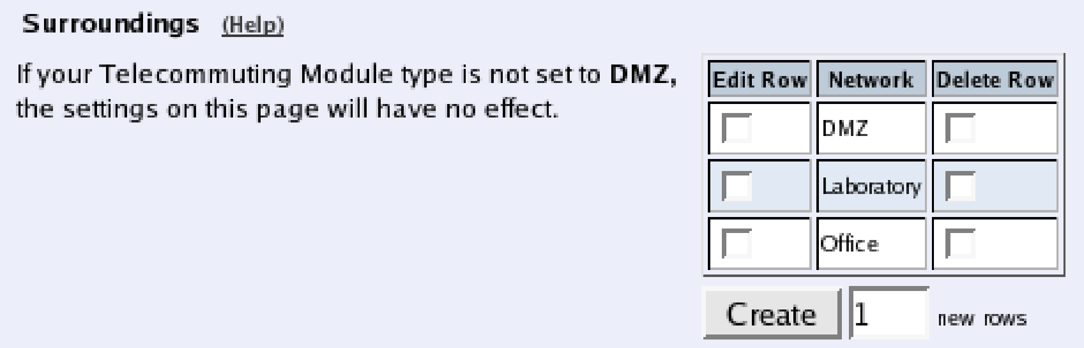
Normally, at least one network should be listed here. If no networks are listed, the Telecommuting Module will not perform NAT for any traffic.



Surroundings (Help)

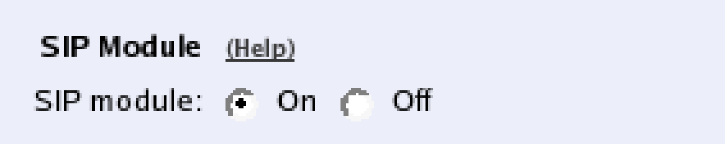
If your Telecommuting Module type is not set to **DMZ**, the settings on this page will have no effect.

Edit Row	Network	Delete Row
□	DMZ	□
□	Laboratory	□
□	Office	□

Create 1 new rows

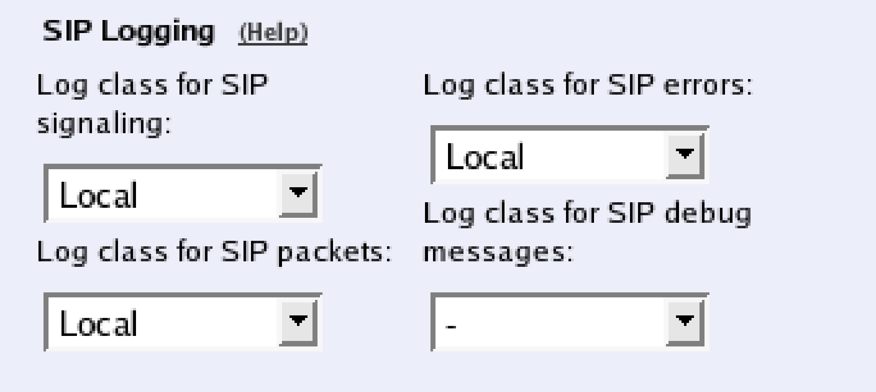
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

Log class for SIP packets: Local

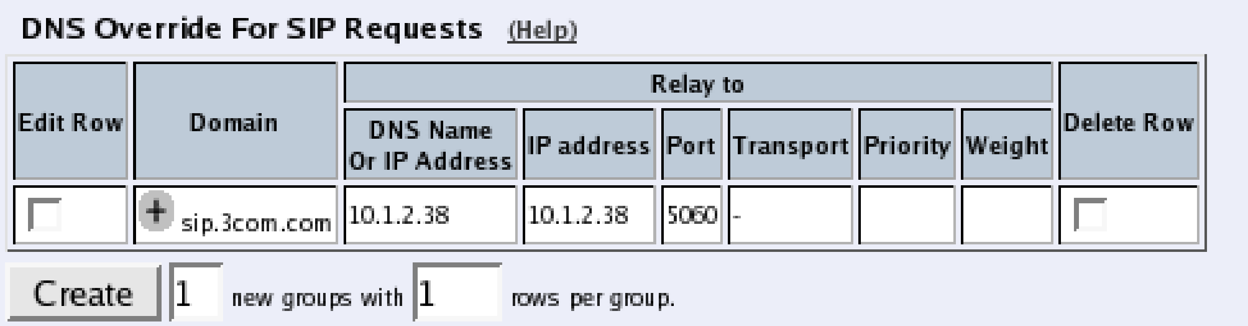
Log class for SIP errors: Local

Log class for SIP debug messages: -

Routing

If the SIP server is located on a NATed network, all SIP traffic from the outside will be directed to the Telecommuting Module, which must know where to forward it.

One way to do this is to enter the SIP domain in the **DNS Override For SIP Requests** table on the **Routing** page, to link the SIP server IP address to the name. The Telecommuting Module will look up the domain here instead of in the DNS server, and send the SIP traffic to the correct IP address.



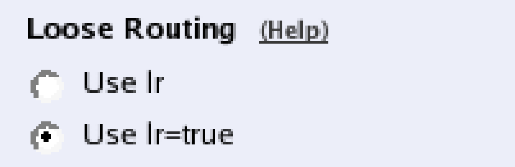
DNS Override For SIP Requests (Help)

Edit Row	Domain	Relay to						Delete Row
		DNS Name Or IP Address	IP address	Port	Transport	Priority	Weight	
□	+ sip.3com.com	10.1.2.38	10.1.2.38	5060	-			□

Create 1 new groups with 1 rows per group.

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.

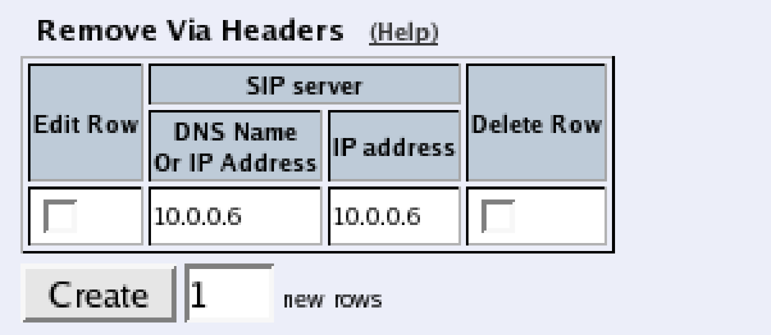


Loose Routing (Help)

○ Use lr

● Use lr=true

If the SIP server is an LCS (Live Communications Server) or some other server that does not accept more than one Via header in SIP packets, you must enter the SIP server IP address in the **Remove VIA headers** table. This will make the Telecommuting Module strip SIP packets of extra Via headers when it sends those packets to the server, and add the Via headers when the response packets are received.



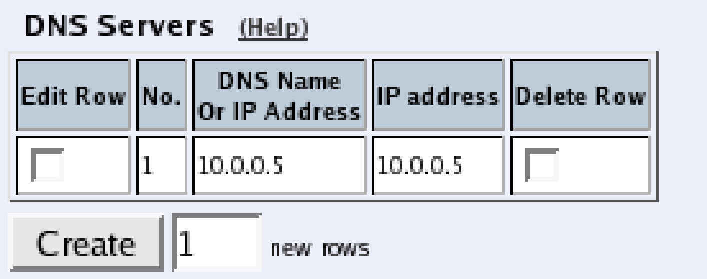
Remove Via Headers (Help)

Edit Row	SIP server		Delete Row
	DNS Name Or IP Address	IP address	
□	10.0.0.6	10.0.0.6	□

Create 1 new rows

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.



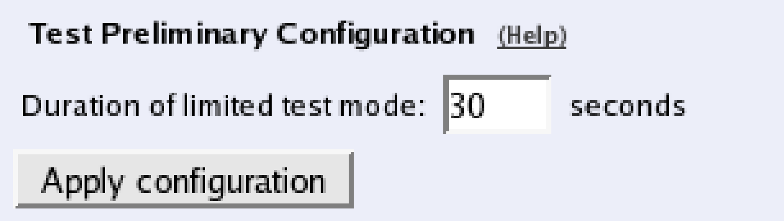
DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

Create 1 new rows

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

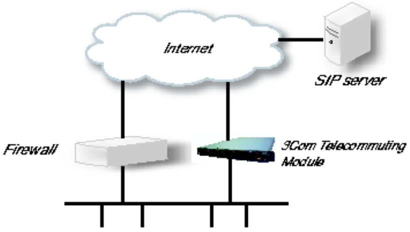
Duration of limited test mode: 30 seconds

Apply configuration

Standalone Telecommuting Module, SIP server on the outside

The simplest SIP scenario is when the SIP server is managed by someone else, and the Telecommuting Module SIP function is only used to traverse NAT.

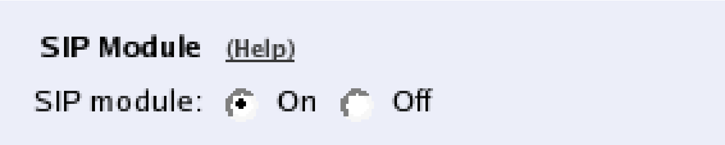
Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.



Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

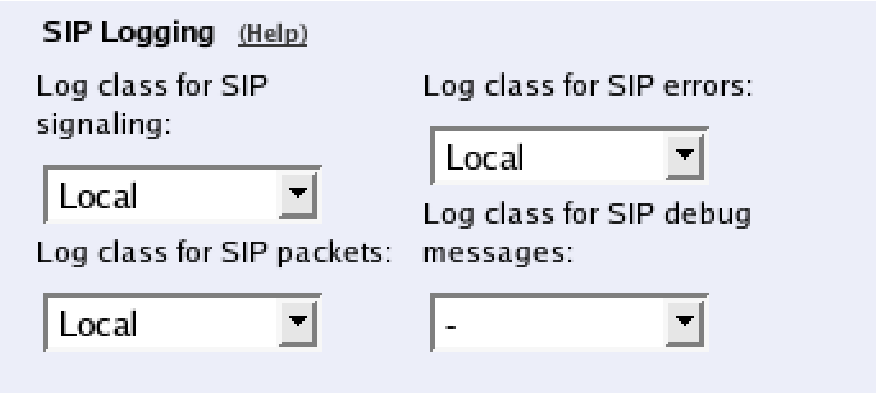
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

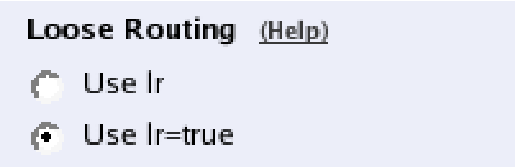
Log class for SIP errors: Local

Log class for SIP packets: Local

Log class for SIP debug messages: -

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.



Loose Routing (Help)

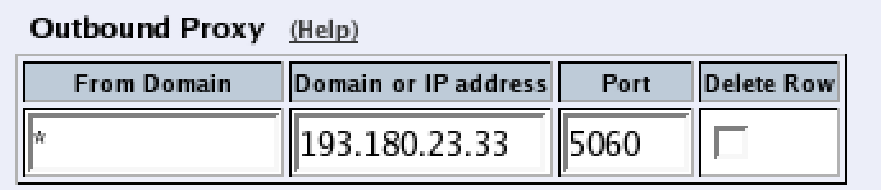
○ Use lr

● Use lr=true

Routing

On the **Routing** page, you can enter the SIP server managing your SIP domain. Enter the name or IP address of the SIP server under **Outbound proxy**.

If you enter the server name here, all SIP traffic from the inside will be directed to this server, regardless of where it is bound to.

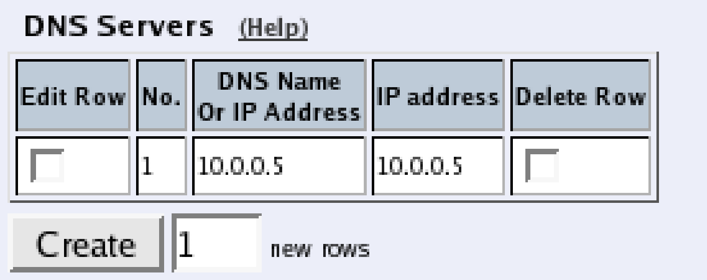


Outbound Proxy (Help)

From Domain	Domain or IP address	Port	Delete Row
*	193.180.23.33	5060	□

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.

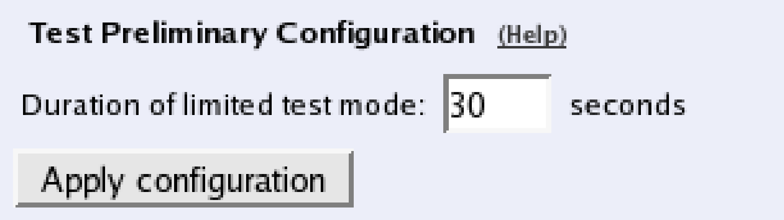


DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

Duration of limited test mode: 30 seconds

Client Settings

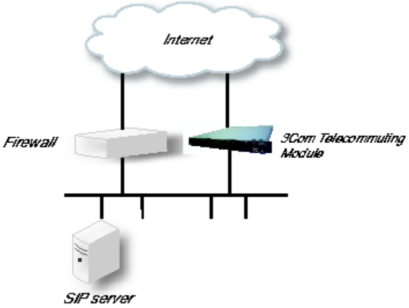
SIP clients will use the Telecommuting Module as their outgoing SIP proxy and the SIP domain as the registrar.

Standalone Telecommuting Module, SIP server inside

You might instead have a SIP server of your own, located on the inside or maybe on a DMZ.

If the SIP server is located on a NATed network, DNS queries for the SIP domain should point to the Telecommuting Module, which in turn will forward the SIP traffic to the server.

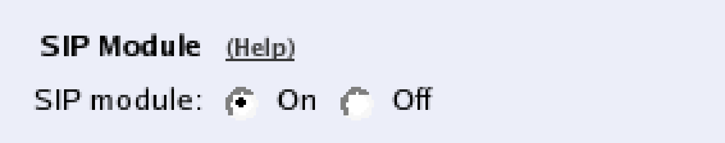
Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.



Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

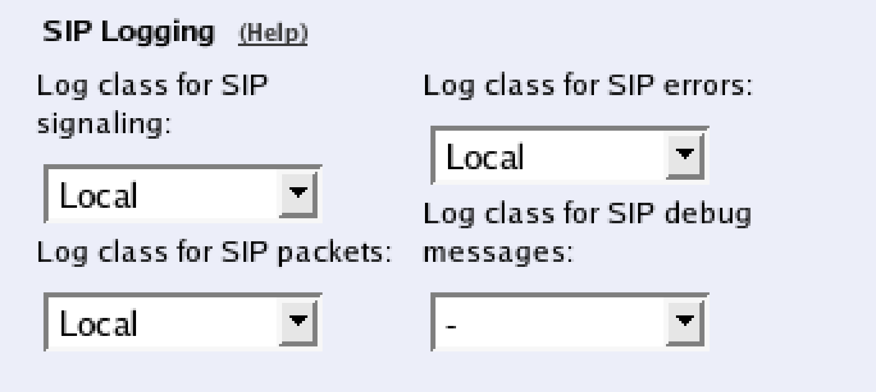
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

Log class for SIP errors: Local

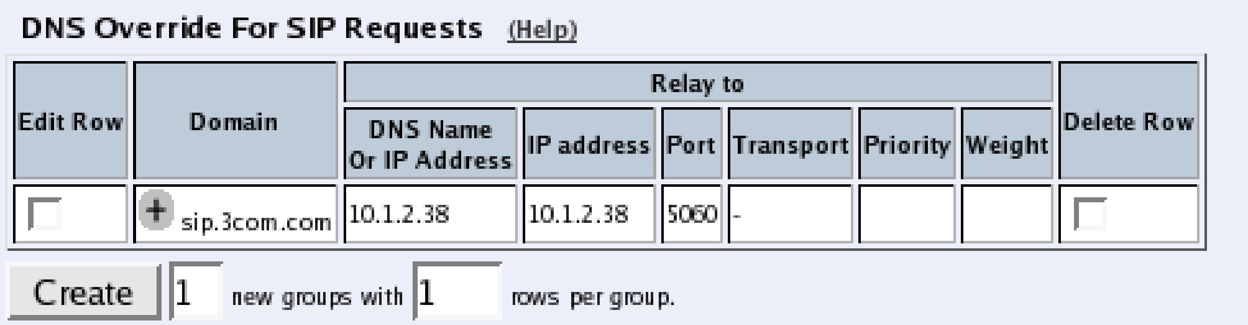
Log class for SIP packets: Local

Log class for SIP debug messages: -

Routing

If the SIP server is located on a NATed network, all SIP traffic from the outside will be directed to the Telecommuting Module, which must know where to forward it.

One way to do this is to enter the SIP domain in the **DNS Override For SIP Requests** table on the **Routing** page, to link the SIP server IP address to the name. The Telecommuting Module will look up the domain here instead of in the DNS server, and send the SIP traffic to the correct IP address.



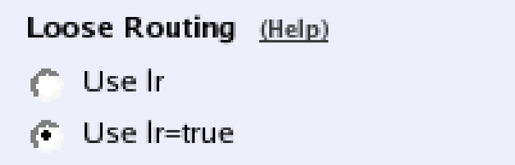
DNS Override For SIP Requests (Help)

Edit Row	Domain	Relay to						Delete Row
		DNS Name Or IP Address	IP address	Port	Transport	Priority	Weight	
□	⊕ sip.3com.com	10.1.2.38	10.1.2.38	5060	-			□

Create [1] new groups with [1] rows per group.

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.

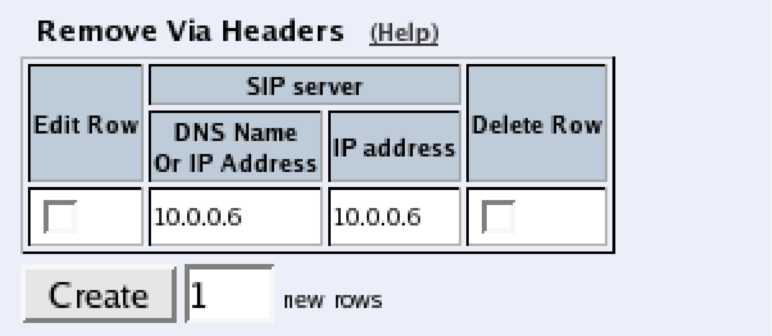


Loose Routing (Help)

○ Use lr

● Use lr=true

If the SIP server is an LCS (Live Communications Server) or some other server that does not accept more than one Via header in SIP packets, you must enter the SIP server IP address in the **Remove VIA headers** table. This will make the Telecommuting Module strip SIP packets of extra Via headers when it sends those packets to the server, and add the Via headers when the response packets are received.



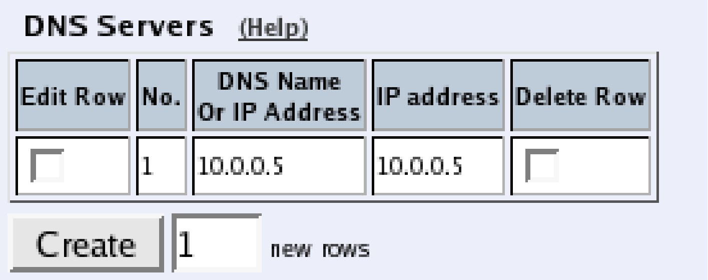
Remove Via Headers (Help)

Edit Row	SIP server		Delete Row
	DNS Name Or IP Address	IP address	
□	10.0.0.6	10.0.0.6	□

1 new rows

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.



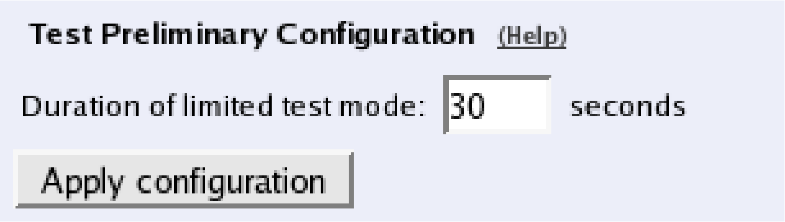
DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

1 new rows

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

Duration of limited test mode: 30 seconds

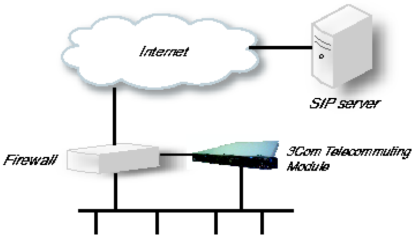
Client Settings

SIP clients will use the Telecommuting Module as their outgoing SIP proxy and the SIP domain as the registrar.

DMZ/LAN Telecommuting Module, SIP server on the outside

The simplest SIP scenario is when the SIP server is managed by someone else, and the Telecommuting Module SIP function is only used to traverse NAT.

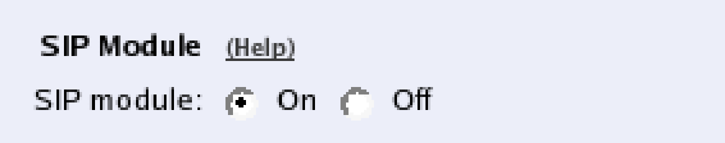
Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.



Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

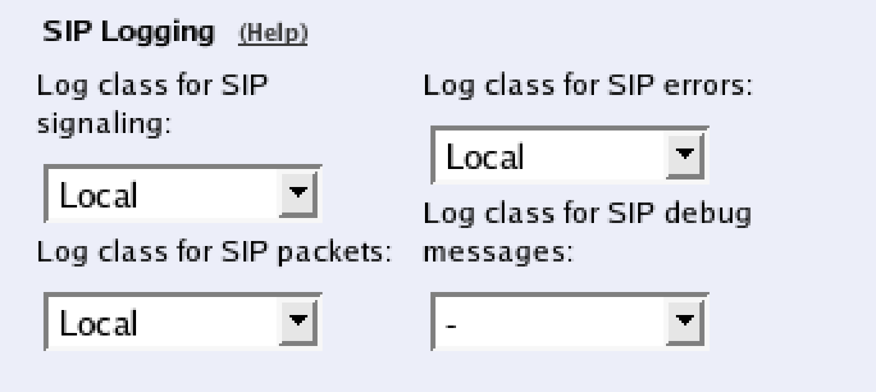
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

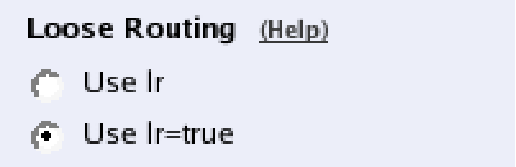
Log class for SIP errors: Local

Log class for SIP packets: Local

Log class for SIP debug messages: -

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.



Loose Routing (Help)

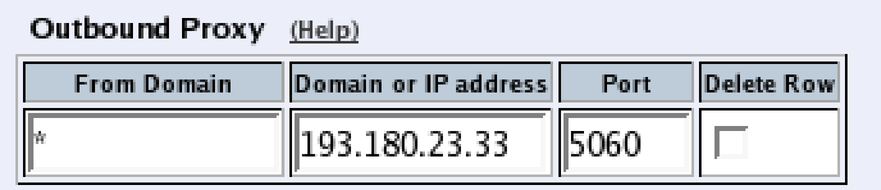
○ Use lr

● Use lr=true

Routing

On the **Routing** page, you can enter the SIP server managing your SIP domain. Enter the name or IP address of the SIP server under **Outbound proxy**.

If you enter the server name here, all SIP traffic from the inside will be directed to this server, regardless of where it is bound to.

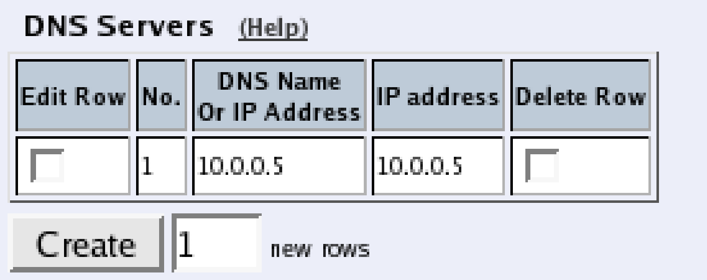


Outbound Proxy (Help)

From Domain	Domain or IP address	Port	Delete Row
*	193.180.23.33	5060	□

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.

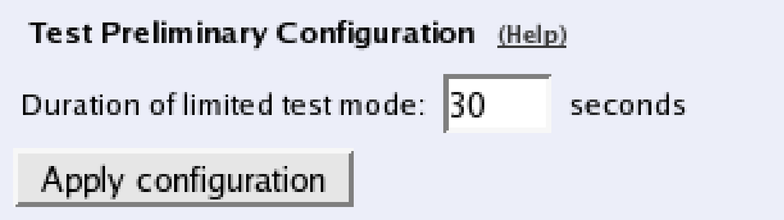


DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

Duration of limited test mode: 30 seconds

Client Settings

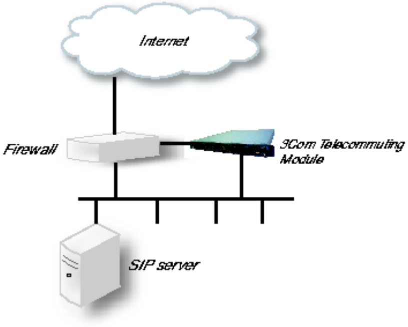
SIP clients will use the Telecommuting Module as their outgoing SIP proxy and the SIP domain as the registrar.

DMZ/LAN Telecommuting Module, SIP server inside

You might instead have a SIP server of your own, located on the inside or maybe on a DMZ.

If the SIP server is located on a NATed network, DNS queries for the SIP domain should point to the Telecommuting Module, which in turn will forward the SIP traffic to the server.

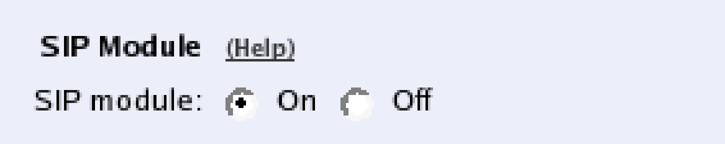
Note that the Telecommuting Module must have a public (non-NATed) IP address for the SIP signaling to work correctly.



Here are the settings needed for this. It is assumed that the Telecommuting Module already has a network configuration. Only the additional SIP settings are listed.

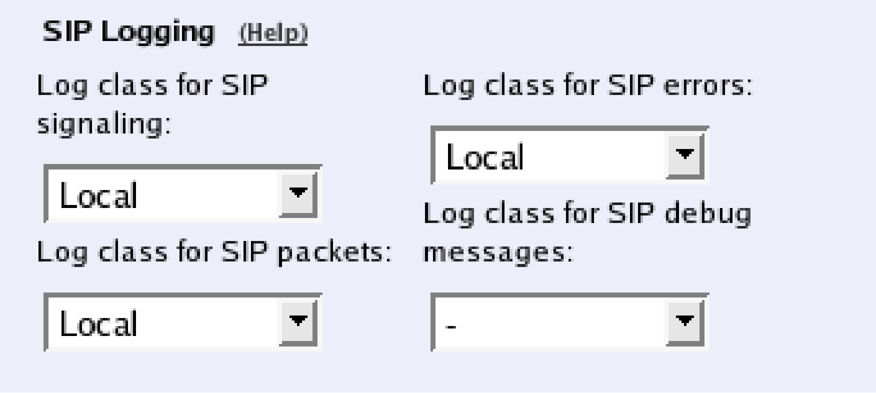
Basic

Go to the **Basic** page under **SIP Services** and turn the SIP module on. Here you also select log classes for SIP event logging.



SIP Module (Help)

SIP module: ● On ○ Off



SIP Logging (Help)

Log class for SIP signaling: Local

Log class for SIP errors: Local

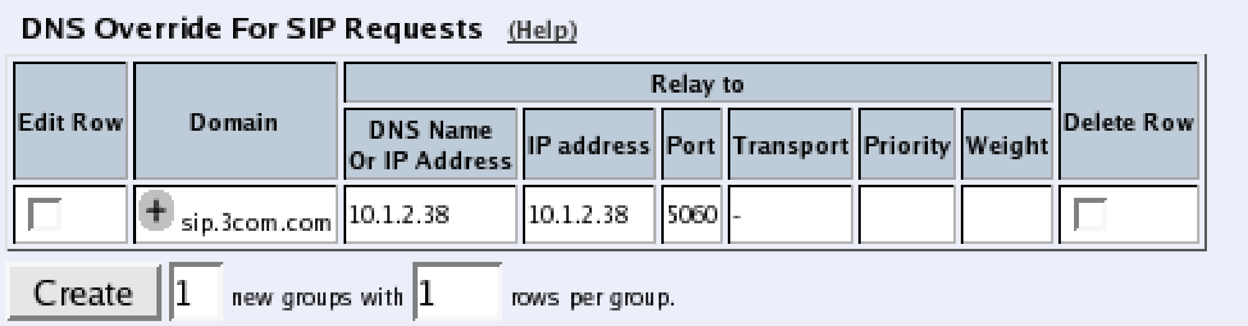
Log class for SIP packets: Local

Log class for SIP debug messages: -

Routing

If the SIP server is located on a NATed network, all SIP traffic from the outside will be directed to the Telecommuting Module, which must know where to forward it.

One way to do this is to enter the SIP domain in the **DNS Override For SIP Requests** table on the **Routing** page, to link the SIP server IP address to the name. The Telecommuting Module will look up the domain here instead of in the DNS server, and send the SIP traffic to the correct IP address.



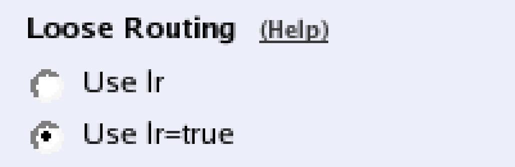
DNS Override For SIP Requests (Help)

Edit Row	Domain	Relay to						Delete Row
		DNS Name Or IP Address	IP address	Port	Transport	Priority	Weight	
□	+ sip.3com.com	10.1.2.38	10.1.2.38	5060	-			□

Create 1 new groups with 1 rows per group.

Interoperability

If Windows Messenger is used for SIP communication, you need to set a parameter on the **Interoperability** page. Set lr=true status to On under **Loose routing**.

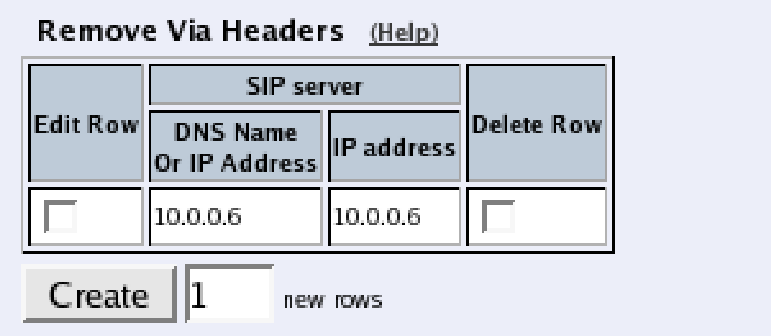


Loose Routing (Help)

○ Use lr

● Use lr=true

If the SIP server is an LCS (Live Communications Server) or some other server that does not accept more than one Via header in SIP packets, you must enter the SIP server IP address in the **Remove VIA headers** table. This will make the Telecommuting Module strip SIP packets of extra Via headers when it sends those packets to the server, and add the Via headers when the response packets are received.

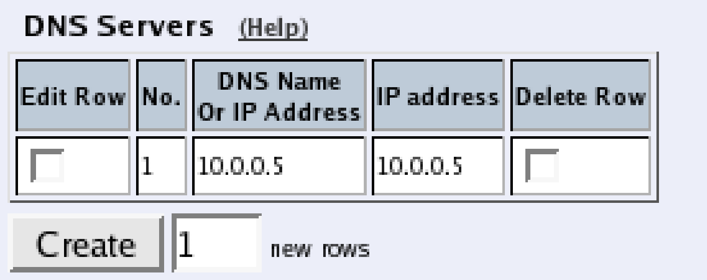


Remove Via Headers (Help)

Edit Row	SIP server		Delete Row
	DNS Name Or IP Address	IP address	
□	10.0.0.6	10.0.0.6	□

Basic Configuration

If no other SIP routing information is entered, the Telecommuting Module must be able to look up SIP domains in DNS. DNS servers are entered on the **Basic Configuration** page under **Basic Configuration**.

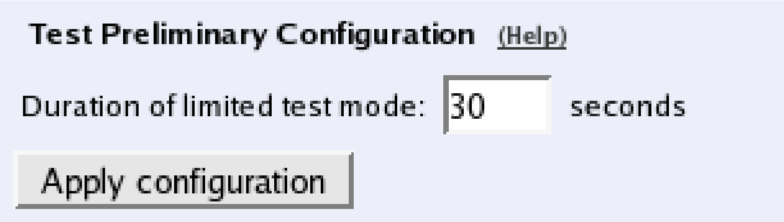


DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

Save/Load Configuration

Finally, go to the **Save/Load Configuration** page under **Administration** and apply the new settings by pressing **Apply configuration**.



Test Preliminary Configuration (Help)

Duration of limited test mode: 30 seconds

Client Settings

SIP clients will use the Telecommuting Module as their outgoing SIP proxy and the SIP domain as the registrar.

Part III. Description of 3Com VCX IP Telecommuting Module Settings

This part contains complete descriptions of settings in 3Com VCX IP Telecommuting Module. The descriptions are grouped in the same way as they are in the user interfaces.

Chapter 5. The Serial Console

Some settings are available without having to log on the web interface, but instead connecting to the Telecommuting Module console via the serial cable. Here, the settings available from the console are listed.

The serial console is a text user interface which requires a terminal software on your workstation, such as Hyperterm in Windows.

Connecting to the serial console

Connect the Telecommuting Module to your workstation with a null modem serial cable, plug in the power cord and turn the Telecommuting Module on. You will have to wait a few minutes while it boots up.

If you use a Windows workstation, connect like this: Start *Hyperterm*. A Location dialogue will show, asking for your telephone number and area. Click Cancel followed by Yes. Then you will be asked to make a new connection. Type a name for this connection, select an icon and click OK. The Location dialogue will show again, so click Cancel followed by Yes.

Now you can select Connect using COM1 and click OK. A Port settings dialogue will show, where you select 19200 as Bits per second. Use the default configuration for all other settings. Click OK and wait for a login prompt. (In some cases you have to press Return to get the login prompt.)

If you use a Linux workstation, connect like this: Make sure that there is a symbolic link named /dev/modem which points to the serial port you connected the Telecommuting Module to. Connect using *minicom* with the bit rate 19200 bits/s, and wait for a login prompt.

Log on as the user *admin*. The first time you log on, no password is required. You set the password when you run the installation script, which starts automatically when you have logged on.

Main Menu

The first thing you see after logging on as *admin* is the main menu. Here, you can change password, make a basic configuration of the Telecommuting Module, enter the Telecommuting Module into a failover team, save or load configuration, or remove all log messages from the e-mail queue.

```
3Com VCX IP Telecommuting Module Administration
  1. Basic configuration
  2. Save/Load configuration
  3. Become a failover team member
  4. Leave failover team and become standalone
  5. Wipe email logs
  6. Set password
  q. Exit admin
  ==>
```

1. Basic configuration

Basic settings for the Telecommuting Module, such as the IP address and the password.

This is one of two ways of giving the Telecommuting Module an IP address. The other way is to perform a *magic ping* (see chapter 2, Installing 3Com VCX IP Telecommuting Module).

2. Save/Load configuration

Save or upload the configuration using the Zmodem protocol.

3. Become a failover team member

Make this Telecommuting Module member of a failover team.

4. Leave failover team and become standalone

Make this Telecommuting Module leave its failover team.

5. Wipe email logs

Remove all log messages queued to be sent by e-mail.

6. Set password

Set a new password for the *admin* user.

q. Exit admin

Log out from the *admin* program.

Basic configuration

Use **Basic configuration** to give the Telecommuting Module a start configuration. You can assign an IP address to it (for the web GUI), enter the IP addresses of computers allowed to connect to the web GUI and change the administrator password.

Wherever you can enter a value, there will be a default one in brackets, which is the current value. Press Return to select the default value. This is an easy way to fast-forward if you only want to change one of the parameters.

IP address

Give the Telecommuting Module an IP address. The IP address will be added to any addresses already configured on the Telecommuting Module. The IP address entered here is the one that should be used to access the web GUI.

```
Basic unit installation program version 4.3

Press return to keep the default value

Network configuration inside:
 Physical device name[eth0]:
 IP address [0.0.0.0]: 10.47.2.242
 Netmask/bits [255.255.255.0]: 255.255.0.0
 Deactivate other interfaces? (y/n) [n]
```

Physical device name

Select which interface should get the IP address. The interfaces use their physical names: if you want to use Network Interface 1, enter "eth0", and if you want to use Network Interface 2, enter "eth1".

IP address

Enter the IP address for the Telecommuting Module on the interface above. If the Telecommuting Module didn’t have an IP address before, the default address will be 0.0.0.0. Enter a different address, or the Telecommuting Module will be unreachable via the web GUI.

Netmask/bits

At **Netmask/bits**, enter the netmask for the network to which the IP address above belongs. The netmask can be written as an IP address or a number of bits (see also chapter 3, Configuring 3Com VCX IP Telecommuting Module).

Deactivate other interfaces

If the Telecommuting Module has been used one or more interfaces are active. Select here if all interfaces but the one selected above should be deactivated. You can activate them again via the web GUI.

Configuration computers

Enter here the computers from which it is allowed to configure the Telecommuting Module. The computers entered here are the only ones allowed to access the web GUI.

Select between allowing a single computer or an entire network.

```
Computers from which configuration is allowed:

You can select either a single computer or a network.

Configure from a single computer? (y/n) [y]
```

Configure from a single computer

If configuration of the Telecommuting Module should be allowed from a single computer only, answer **y** to the question above. Then enter the IP address of the configuration computer.

```
IP address [0.0.0.0]: 10.47.2.240
```

If the configuration computer is on the same network as the Telecommuting Module, these are all configuration settings needed. If the configuration computer is on a different network, the Telecommuting Module will ask for routing to that network.

```
Static routing:
The computer allowed to configure from is not on a network local to
this unit. You must configure a static route to it. Give
the IP address of the router on the network the unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

To let the Telecommuting Module know where traffic to the configuration computer should be sent to, you must enter the router it should use here. Enter the router which is on the same network as the Telecommuting Module and which is used to route traffic to the configuration computer.

You should also enter the network to which the configuration computer is connected.

Configure from multiple computers

If configuration of the Telecommuting Module should be allowed from more than one computer, answer **n** to the question above. Then enter the network address of the network to which the configuration computers are connected. This will allow all computers on this network to configure the Telecommuting Module.

```
Network number [0.0.0.0]: 10.47.2.0
Netmask/bits [255.255.255.0]: 255.255.255.0
```

Enter the network address and netmask for the configuration computer network. If they are on the same network as the Telecommuting Module, these are all configuration settings needed. If the configuration computers are on a different network, the Telecommuting Module will ask for routing to that network.

```
Static routing:
The network allowed to configure from is not on a network local to this
unit. You must configure a static route to it. Give the
IP address of the router on the network this unit is on.

The IP address of the router [0.0.0.0]: 10.47.3.1
Network address [10.47.0.0]: 10.10.0.0
Netmask [255.255.255.0]:
```

Enter the IP address of the router and the network to which the configuration computers are connected. This could be a bigger network than the one entered to distinguish the configuration computers.

Password

Set a password for the Telecommuting Module here.

```
Password []:
```

Note that the password will be printed on the screen when entered. It will also be shown when all settings are made.

Other

You can also select if all other configuration should be removed or not.

```
Other configuration
Do you want to reset the rest of the configuration? (y/n) [n]
```

If you answer `n`, nothing is removed. If you answer `y`, you have three alternatives to select from:

1. Clear as little as possible. This is the alternative that is used if you answer `n` to the question above. Both the preliminary and the permanent configurations will be updated with the configuration specified above.
2. Revert to the factory configuration and then apply the configuration specified above. This will affect the permanent but not the preliminary configuration.
3. Revert to the factory configuration and empty all logs and then apply the configuration specified above. Both the preliminary and the permanent configurations will be affected.

```
Update mode (1-3) [1]:
```

When all settings are entered, they are shown on the screen to be confirmed.

```
 Is this configuration correct (yes/no/abort)?
```

`yes` will make the Telecommuting Module reboot using the new settings.

`no` will make the Telecommuting Module go through the Basic configuration questions again and allow you to change settings.

`abort` will make the Basic configuration script end without changing any settings.

Save/Load configuration

Here, you can save your configuration to a file or load a configuration from a file. The transfer is made using the Zmodem protocol, which can be found in terminal software such as Hyperterminal.

Load preliminary configuration

The configuration file selected here will be uploaded as a preliminary configuration. The permanent configuration will not be affected.

To load the configuration, select this alternative and then start the transfer in your terminal program.

Load both configurations and apply

The configuration file selected here will be uploaded as both the preliminary and the permanent configuration. When the upload is finished, the configuration will be applied.

To load the configuration, select this alternative and then start the transfer in your terminal program.

Save preliminary configuration

Save the preliminary configuration to a file. If your terminal program starts the transfer automatically, the file will be named `config.cfg`.

Save permanent configuration

Save the permanent configuration to a file. If your terminal program starts the transfer automatically, the file will be named `config.cfg`.

Main menu

Select this alternative to return to the main menu.

Become a failover team member

Here, you make the Telecommuting Module the second member of a failover team. All current configuration will be removed. The Telecommuting Module will receive its new configuration from the first member of the team.

```
Dedicated network interface [eth0]:
```

Select the network interface which will be directly connected to the other Telecommuting Module in the team. This interface will be used to synchronize the configurations and can’t be used for anything else. The interfaces use their physical names: if you want to use Network Interface 1, enter "eth0", and if you want to use Network Interface 2, enter "eth1".

```
IP network address for eth0 [10.120.121.64]:
```

Enter the network address for this interface. The network address must be the same as the one entered for the first member of the failover team. If you used the default values for that Telecommuting Module you can do the same here.

```
IP netmask for eth0 [255.255.255.252]:
```

Enter the netmask for the network. The netmask must be big enough to comprise IP addresses for two computers, a network address and a broadcast address, i.e. at least four addresses. The default netmask (255.255.255.252) should suffice. There is no use in assigning a larger network, since the Telecommuting Modules should be connected via a crossover TP cable.

```
Current configuration:
  Dedicated interface: eth0
  Network address:     10.120.121.64
  Network mask:        255.255.255.252

Is this configuration correct (yes/no/abort)?
```

When all settings are made they are shown.

yes will make the Telecommuting Module reboot, remove all current configuration and apply the new settings. It will then wait for configuration from the other team member.

no will make the Telecommuting Module start over again asking for new settings, starting with the dedicated interface.

abort will abort the failover configuration and return to the main menu without changing any settings on the Telecommuting Module.

Leave failover team and become standalone

Here, you make the Telecommuting Module leave its failover team. The Telecommuting Module will keep the configuration from the team except the failover settings.

```
This will change the operation mode from being a member of
a failover team to become a standalone machine.
The machine will reboot to complete this procedure.

Do you want to proceed (yes/no)?
```

yes will make the Telecommuting Module leave the failover team and reboot as a standalone unit.

no will make you return to the main menu without changing any settings.

Wipe email logs

Here, you can erase all log messages queued for sending via email to one or more receivers. This could be useful if you by mistake made settings where lots of events are logged via email, which fill the queue rapidly.

```
This will remove all email logs that are waiting to be sent.

Do you want to proceed (yes/no)?
```

yes will remove all log messages from the email queue. These messages are not saved to file or similar before removed. If you log locally as well as via email, the local log will not be affected by this.

Note that this will only remove messages already queued up for sending. To prevent further queue jams, you must also change log classes for the events in question (see chapter 11, Logging).

no will amke you return to the main menu without removing anything.

Set password

Here, you can change password for the *admin* user.

```
Old password:
New password:
New password again:
```

As this option requires that you are logged on as *admin*, you need to know the current password in order to change into a new one. If you have forgotten the password, you must use the installation diskette to set a new one.

Exit admin

Select **Exit admin** to log out.

Chapter 6. Basic Configuration

Under **Basic Configuration**, you configure:

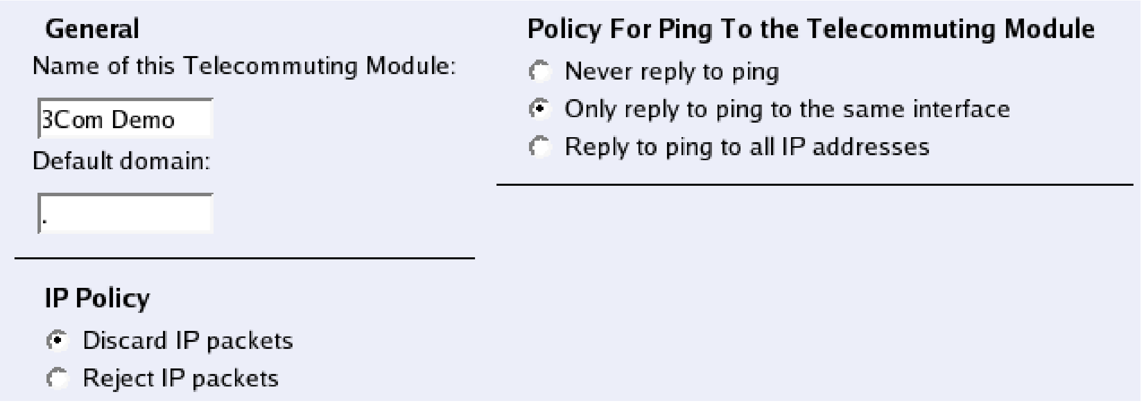
- Telecommuting Module Type
- The name of the Telecommuting Module
- The computers and networks from which the Telecommuting Module can be administered
- Policies for ping packets and unwanted packets
- Default domain
- Default gateways and DNS servers
- RADIUS configuration
- SNMP configuration
- Creation of Telecommuting Module certificates and upload of CA certificates

This configuration is usually not changed very often.

Basic Configuration

On the **Basic Configuration** page, general settings for the Telecommuting Module are made. The most important ones for getting started are the default gateway and, for SIP, the DNS server.

General



General

Name of this Telecommuting Module: 3Com Demo

Default domain: .

IP Policy

● Discard IP packets

○ Reject IP packets

Policy For Ping To the Telecommuting Module

○ Never reply to ping

● Only reply to ping to the same interface

○ Reply to ping to all IP addresses

Name of this Telecommuting Module

Here, you can give your 3Com VCX IP Telecommuting Module a name. The name of the Telecommuting Module is displayed in the title bar of your web browser. This can be a good idea if you administer several Telecommuting Modules. The name is also used if you use SNMP and when you export log files into the WELF format.

Default domain

Here, you can enter a default domain for all settings. If a default domain is entered, the Telecommuting Module will automatically assume that an incomplete computer name should be completed with the default. If, for example, **Default domain** contains **`company.com`**, you could as the name of the computer axel.company.com use only **`axel`**. If no default domain should be used, the **Default domain** field should contain a single dot (.).

IP policy

Here, you specify what will happen to IP packets which are neither SIP packets, SIP session media streams, or Telecommuting Module administration traffic. **Discard IP packets** means that the Telecommuting Module ignores the IP packets without replying that the packet did not arrive. **Reject IP packets** makes the Telecommuting Module reply with an ICMP packet telling that the packet did not arrive.

Policy For Ping To the Telecommuting Module

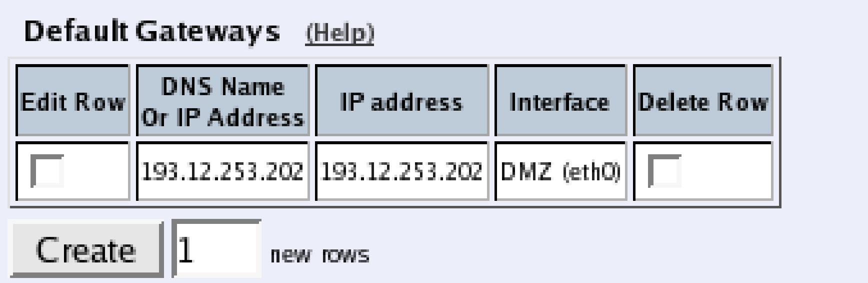
Here, you specify how the Telecommuting Module should reply to ping packets to its IP addresses. You can choose between **Never reply to ping**, **Only reply to ping from the same interface** and **Reply to ping to all IP addresses**. **Only reply to ping from the same interface** means that the ping request should originate from a network which is directly connected to the pinged interface of the Telecommuting Module or from a network to which there exists a static route from the pinged interface, or the request will be ignored.

Ping is a way of finding out whether a computer is working. See appendix D, Definitions of Terms, for further information on ping.

Default Gateways

A **Default Gateway** is the IP address of a router that is used to contact the outside world. This IP address is usually the firewall. **Default Gateway** must be an IP address from one of the Directly Connected Networks of the Telecommuting Module's interfaces. See appendix D, Definitions of Terms, for further description of routers/gateways.

The Telecommuting Module must have at least one default gateway to work. You can enter more than one default gateway. The Telecommuting Module will use one of them until it stops responding, and then switch to the next one.



Default Gateways (Help)

Edit Row	DNS Name Or IP Address	IP address	Interface	Delete Row
□	193.12.253.202	193.12.253.202	DMZ (eth0)	□

DNS name or IP address

Enter the DNS name or IP address for the default gateway. If an interface will receive its IP address from a DHCP server, the Telecommuting Module will get its default gateway from the server, and **Default Gateway** must be set to "*".

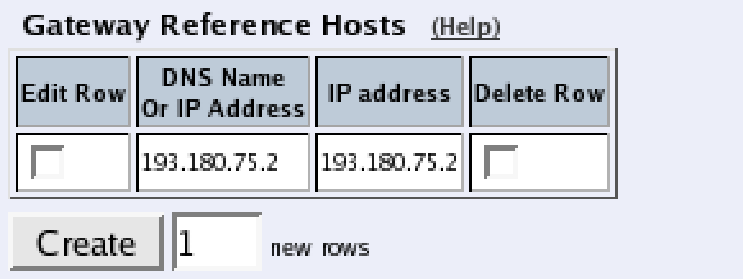
IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Gateway Reference Hosts

The gateway reference hosts are used by the Telecommuting Module to check if the gateways are alive. For each reference host, test ping packets are sent, using the different gateways.

Reference hosts are only needed when multiple default gateways are used.



Gateway Reference Hosts (Help)

Edit Row	DNS Name Or IP Address	IP address	Delete Row
□	193.180.75.2	193.180.75.2	□

DNS name or IP address

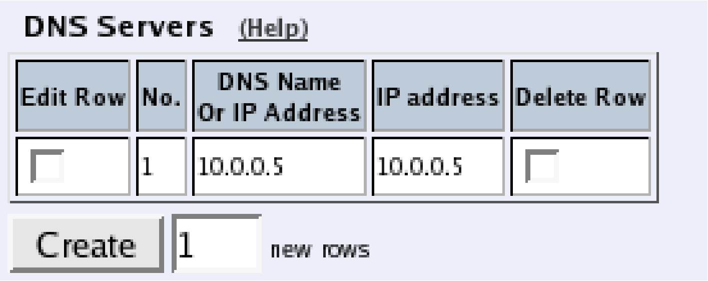
Enter the DNS name or IP address for the reference host. The reference host must be located on the other side of the default gateway.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

DNS Servers

Here, you configure DNS servers for the Telecommuting Module. The servers are used in the order they appear in this table, which means that the Telecommuting Module uses the top server to resolve DNS records until it doesn't reply. Only then is server number two contacted.



DNS Servers (Help)

Edit Row	No.	DNS Name Or IP Address	IP address	Delete Row
□	1	10.0.0.5	10.0.0.5	□

No.

The DNS servers are used in the order they are presented in the table. To move a server to a certain row, enter the number on the row to which you want to move it. You need only renumber servers that you want to move; other servers are renumbered automatically. When you click on **Save**, the DNS servers are re-sorted.

DNS Name Or IP Address

The DNS name/IP address of the DNS server which the Telecommuting Module should use. Note that to use DNS names here, there must exist a DNS server in the Telecommuting Module's permanent configuration.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves the Basic Configuration configuration to the preliminary configuration.

Cancel

Reverts all the above fields to their previous configuration.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered above.

Access Control

On the **Access Control** page, settings are made which controls the access to the Telecommuting Module administration web interface.

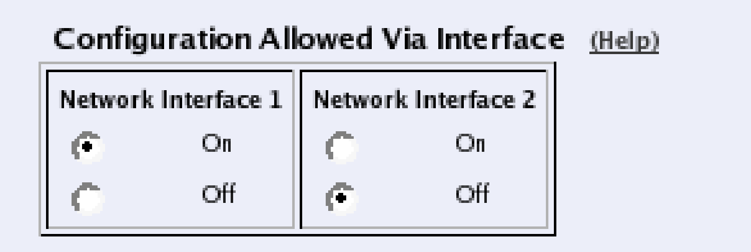
Select one or two configuration IP addresses for the Telecommuting Module. The configuration address is the IP address to which you direct your web browser to access the web interface of the Telecommuting Module.

For each network interface, you also specify whether or not the Telecommuting Module can be configured via this network interface.

You also select what kind of authentication will be performed for the users trying to access the web interface.

To further increase security, the Telecommuting Module can only be configured from one or a few computers that are accessed from one of these interfaces. Enter the IP address or addresses that can configure the Telecommuting Module. The IP addresses can belong to one or more computers.

Configuration Allowed Via Interface

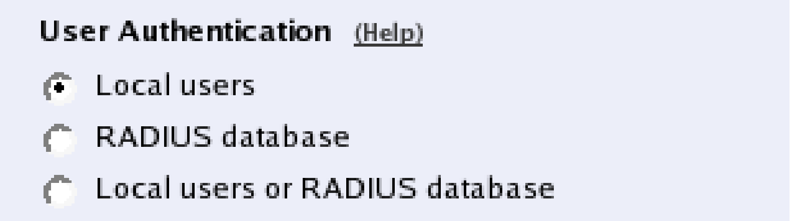


Configuration Allowed Via Interface

Network Interface 1		Network Interface 2	
●	On	○	On
○	Off	●	Off

Specify whether or not this interface can be used to configure the Telecommuting Module. The choices are **On** and **Off**. This configuration is a complement to the **Configuration Computers** setting below.

User Authentication



User Authentication

● Local users

○ RADIUS database

○ Local users or RADIUS database

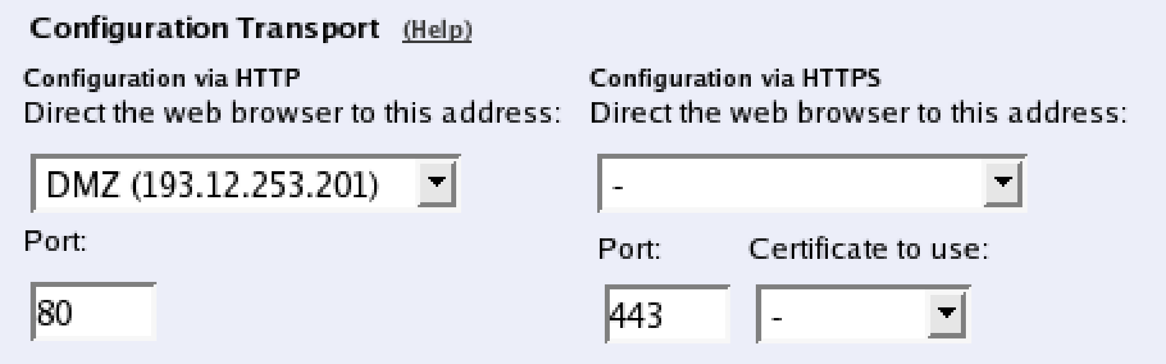
Select where the administrator database is: **Local users** (administrator users are defined locally on the Telecommuting Module), **RADIUS** (administrator users are defined on an external RADIUS server), or a choice between the two alternatives at login (**Local users or RADIUS database**).

Local administrator users and their passwords are defined on the **User Administration** page under **Administration**. If the authentication should be made by help of a RADIUS server, you must enter one on the **RADIUS** page.

Configuration Transport

Select one or two Telecommuting Module IP addresses. The Telecommuting Module web server will listen for web traffic on the selected IP addresses and ports.

This is the IP address and port which should be entered in your web browser to connect to the Telecommuting Module.



Configuration Transport

Configuration via HTTP
Direct the web browser to this address: DMZ (193.12.253.201)
Port: 80

Configuration via HTTPS
Direct the web browser to this address: -
Port: 443
Certificate to use: -

Configuration via HTTP

Select which IP address and port the Telecommuting Module administrator should direct her web browser to when HTTP is used for Telecommuting Module configuration. You can select from the Telecommuting Module IP addresses configured on the **Interface** pages under **Network**.

You can use different IP addresses for HTTP and HTTPS configuration.

Configuration via HTTPS

Select which IP address and port the Telecommuting Module administrator should direct her web browser to when HTTPS is used for Telecommuting Module configuration. You can select from the Telecommuting Module IP addresses configured on the **Interface** pages under **Network**.

You can use different IP addresses for HTTP and HTTPS configuration.

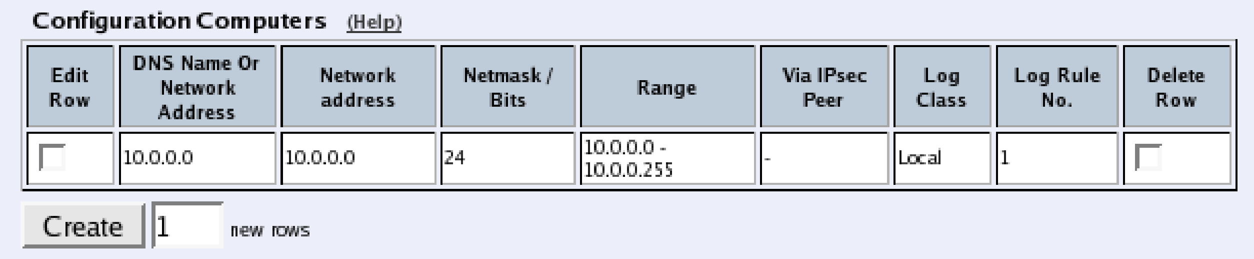
You also need to select a TLS certificate, which works as an ID card, identifying the Telecommuting Module to your web browser. This will ensure that you are really communicating with your Telecommuting Module and not somebody else’s computer. TLS uses an encryption method using two keys, one secret and one public. The secret key is kept in the Telecommuting Module and the public key is used in the certificate. If any of the keys is changed, the TLS connection won’t work.

The certificate is created on the **Certificates** page.

Configuration Computers

Enter the IP address or addresses that can configure the Telecommuting Module. The IP addresses can belong to one or more computers.

Note that you must also allow configuration via the Telecommuting Module interface that the computers are connected to. See Configuration Allowed Via Interface above.



Configuration Computers (Help)

Edit Row	DNS Name Or Network Address	Network address	Netmask / Bits	Range	Via IPsec Peer	Log Class	Log Rule No.	Delete Row
□	10.0.0.0	10.0.0.0	24	10.0.0.0 - 10.0.0.255	-	Local	1	□

DNS Name Or Network Address

Enter the DNS name or IP address of the computer or network from which the Telecommuting Module can be configured. Avoid allowing configuration from a network or computer on the Internet or other insecure networks, or use HTTPS or VPN to connect to the Telecommuting Module from these insecure networks.

Network Address

Shows the IP address of the **DNS Name Or Network Address** you entered in the previous field.

Netmask/Bits

Netmask/Bits is the mask that will be used to specify the configuration computers. See chapter 3, Configuring 3Com VCX IP Telecommuting Module, for instructions on writing the netmask. To limit access so that only one computer can configure, use the netmask 255.255.255.255. You can also specify the netmask as a number of bits, which in this case would be 32. To allow configuration from an entire network, you must enter the network address under **Network address**, and a netmask with a lower number here. To allow configuration from several computers or networks, create several lines for the information.

Range

The **Range** shows all IP addresses from which the Telecommuting Module can be configured. The range is calculated from the configuration under **DNS name or network address** and **Netmask/Bits**. Check that the correct information was entered in the **DNS name or network address** and **Netmask/Bits** fields.

Log Class

Here, you enter what log class the Telecommuting Module should use to log the configuration traffic to the Telecommuting Module's web server. Log classes are defined on the **Log Classes** page under **Logging**. See also chapter 11, Logging.

Log Rule No.

The **Log Rule No.** field determines the order of the lines. The order is important in deciding what is logged and warned for. The Telecommuting Module uses the first line that matches the configuration traffic.

Perhaps you want to configure the Telecommuting Module so that configuration traffic from one specific computer is simply logged while traffic from the rest of that computer's network is both logged and generates alarms.

The rules are used in the order in which they are listed, so if the network is listed first, *all* configuration traffic from that network is both logged and generates alarms, including the traffic from that individual computer. But if the individual computer is listed on a separate line before the network, that line will be considered first and all configuration traffic from that computer is only logged while the traffic from the rest of the computer's network is both logged and generates alarms.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves the Access Control configuration to the preliminary configuration.

Cancel

Reverts all the above fields to their previous configuration.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

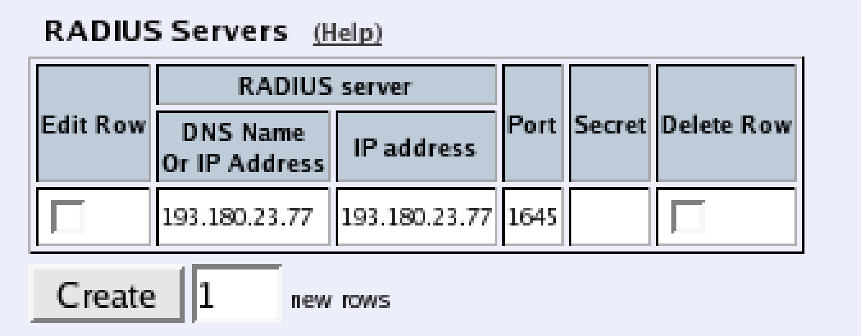
RADIUS

RADIUS (Remote Authentication Dial-In User Service) is an authentication system consisting of one or more servers, and clients using the servers to authenticate users. You could, for example, equip the company modems with RADIUS clients, demanding that a user connecting to a modem first identifies himself to the RADIUS server. Servers and clients communicate via UDP.

3Com VCX IP Telecommuting Module uses RADIUS for authentication of Telecommuting Module administration.

RADIUS Servers

Enter the server(s) that the Telecommuting Module should use. When more than one RADIUS server is entered, make sure that their databases contain the same data, since the Telecommuting Module regards them all alike and uses the server which first replies to a request.



RADIUS Servers (Help)

Edit Row	RADIUS server		Port	Secret	Delete Row
	DNS Name Or IP Address	IP address			
□	193.180.23.77	193.180.23.77	1645		□

1 new rows

RADIUS server

Enter the **DNS name or IP address** for the RADIUS server used for authentication.

In **IP address**, the IP address of the server is shown. It is updated whenever **Look up all IP addresses again** is pressed, or the **DNS name or IP address** field is changed.

Port

The official port for RADIUS is UDP port 1812. However, several RADIUS servers use port 1645, so you may have to change the port number either on the RADIUS server or in the table.

Secret

A RADIUS authentication requires a ’shared secret’, which must be the same on both sides. Since the secret is used as an encryption key, it is important that it is kept a secret. Since the secret is saved unencrypted in the Telecommuting Module configuration, you should be careful with where you store the configuration.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

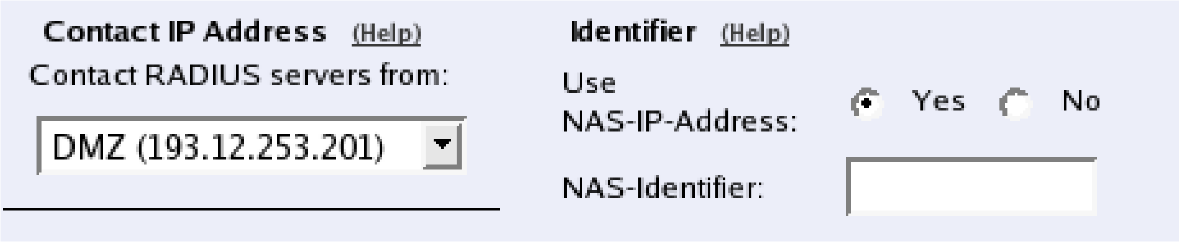
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Identifier

A RADIUS client may use either of two ways to identify itself for the RADIUS server: an IP address or a name (identifier). You must use at least one of these ways, or the authentication will fail.

Select here which method to use. The address or name in use must be registered at the RADIUS servers specified in the top table, and must be unique in that RADIUS database.



Contact IP Address (Help)

Contact RADIUS servers from: DMZ (193.12.253.201)

Identifier (Help)

Use NAS-IP-Address: ● Yes ○ No

NAS-Identifier:

Use NAS-IP-Address

If you select **Yes**, the Telecommuting Module’s IP address (the address selected under **Contact IP Address**) will be enclosed as identity. If you select **No**, you must enter a **NAS-Identifier** for the Telecommuting Module.

NAS-Identifier

You can enter a special identifier into this field. All characters except space are allowed according to the Telecommuting Module, but your RADIUS server may have some restrictions on the identifier.

Contact IP Address

Select the IP address from which the Telecommuting Module should make connections to RADIUS servers. A convenient choice of address is one on the interface closest to the RADIUS server.

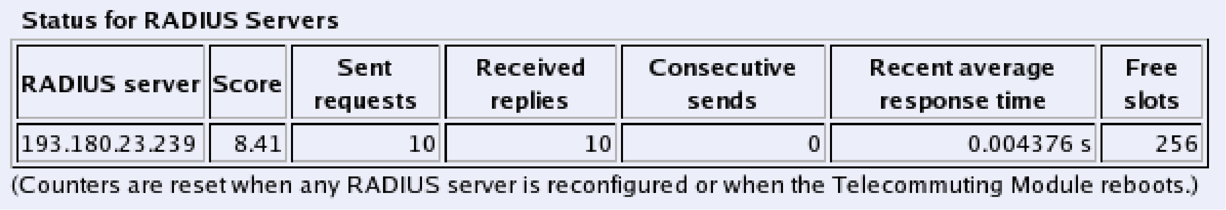
Contact RADIUS servers from

Select a contact address from the IP addresses configured for the interfaces under **Directly Connected Networks** and **Alias**.

Status for RADIUS servers

At the bottom of the page the status for the RADIUS servers is shown. *Radiusmux* is the part of 3Com VCX IP Telecommuting Module that connects to the RADIUS servers.

If no authentication by RADIUS is configured, the radiusmux is not run. When you apply a configuration which involves contacting a RADIUS server, the radiusmux is started.



Status for RADIUS Servers

RADIUS server	Score	Sent requests	Received replies	Consecutive sends	Recent average response time	Free slots
193.180.23.239	8.41	10	10	0	0.004376 s	256

(Counters are reset when any RADIUS server is reconfigured or when the Telecommuting Module reboots.)

RADIUS server

The IP address for this RADIUS server.

Score

Radiusmux gives points (the scale is 1 to 40, inclusive) to the different servers according to their performance. The better server performance, the higher score. Radiusmux uses the score to select which server to query primarily.

Sent requests

The number of UDP packets sent to this server.

Received replies

The number of UDP packets received from this server.

Consecutive sends

The number of consecutive UDP packets sent without response from the server.

Recent average response time

A calculated average of response time for packets for which response has been received.

Free slots

The RADIUS server allocates a certain number of slots for each RADIUS client, and every pending request from the Telecommuting Module occupies a slot. Here you see the current number of free slots.

Save

Saves the RADIUS configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

Configuration of a RADIUS server

In this section it is assumed that you know how to configure your RADIUS server. Consult your RADIUS manual for details.

Add the Telecommuting Module as a client in the RADIUS server. Make sure that the shared secret here is the same as in the Telecommuting Module.

The Telecommuting Module checks the permissions for a user by looking at its RADIUS attribute *Service-Type*. If the Service-Type has the value *Administrative (6)*, the user is allowed to configure the Telecommuting Module.

For the various privileges for users, there is an 3Com-specific RADIUS attribute defined thus:

```
VENDOR 3Com 43

ATTRIBUTE 3Com-Admin-Account 1 integer  3Com

#
#  Type of administrator account.
#
VALUE  3Com-Admin-Account Full-Access-Admin 1
VALUE  3Com-Admin-Account Backup-Admin  2
VALUE  3Com-Admin-Account Read-Only-Admin  3
VALUE  3Com-Admin-Account VPN-Admin  4
VALUE  3Com-Admin-Account SIP-Admin  5
```

More information about RADIUS can be found in RFC 2865.

SNMP

SNMP is a network monitoring protocol, which enables a single server to monitor one or more networks, including all network equipment like routers and firewalls. 3Com VCX IP Telecommuting Module supports SNMP and can accordingly be monitored automatically.

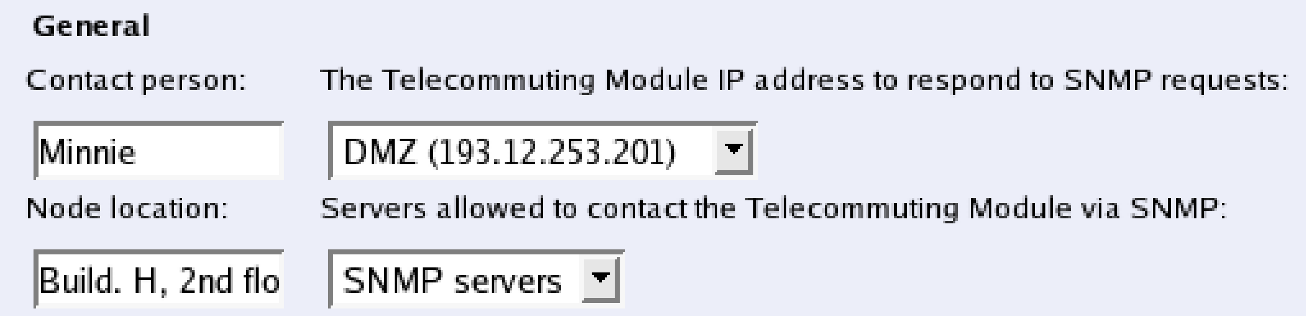
The monitoring signaling consists of two main parts. The SNMP server sends requests to the Telecommuting Module, which replies with a list of network parameters and their values for the Telecommuting Module. The Telecommuting Module can also send messages (traps) without the server prompting, when someone sends a request without valid authentication and when the Telecommuting Module boots.

The 3Com VCX IP Telecommuting Module can only send parameters to the server; no changes of configuration can be made through SNMP requests.

For more information about SNMP, read RFC 1157.

General

Here, decide whether the SNMP signaling should be activated. You can also enter contact information for the Telecommuting Module.



General

Contact person: Minnie

The Telecommuting Module IP address to respond to SNMP requests: DMZ (193.12.253.201)

Node location: Build. H, 2nd flo

Servers allowed to contact the Telecommuting Module via SNMP: SNMP servers

Contact person

Enter the name of the contact person for this 3Com VCX IP Telecommuting Module. This information is sent with the parameter list as reply to an SNMP request from the server.

Node location

Enter the location of the Telecommuting Module. This information is sent with the parameter list as reply to an SNMP request from the server.

The Telecommuting Module IP address to respond to SNMP requests

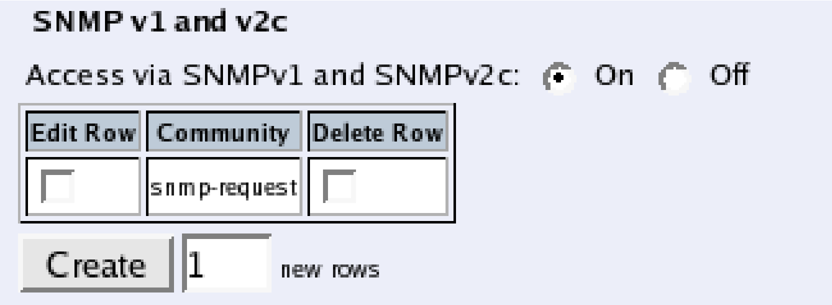
Enter the IP address of the Telecommuting Module to which the SNMP servers should direct their requests. Select from the addresses defined on the **Interface** pages under **Network**.

Servers allowed to contact the Telecommuting Module via SNMP

Select the SNMP server(s) which are allowed to contact the Telecommuting Module. You select from the network groups defined on the **Networks and Computers** page under **Network**.

SNMP v1 and v2c

In SNMP version 1 and 2c, the authentication is managed through an unencrypted password, a *community*. Here, you select if the Telecommuting Module should accept access via v1 or v2c, and enter the valid communities.



SNMP v1 and v2c

Access via SNMPv1 and SNMPv2c: ● On ○ Off

Edit Row	Community	Delete Row
□	snmp-request	□

Create 1 new rows

Access via SNMPv1 and SNMPv2c

Select if access via SNMP version 1 or 2c (using communities as the autentication method) should be **On** or **Off**.

Community

Enter a password. Note that this password is stored unencrypted.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

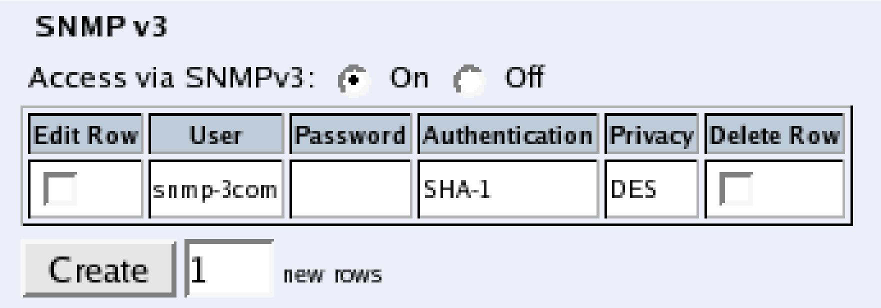
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

SNMP v3

In SNMP version 3, the authentication is managed through the server sending a username and an (in most cases) encrypted password to the Telecommuting Module, which verifies the validity of them.

Here, you select if the Telecommuting Module should accept access via v3, and select the authentication and encryption used for the SNMP reuqests.



SNMP v3

Access via SNMPv3: ● On ○ Off

Edit Row	User	Password	Authentication	Privacy	Delete Row
□	snmp-3com		SHA-1	DES	□

Access via SNMPv3

Select if access via SNMP version 3 (using usernames and encrypted passwords as the autentication method) should be **On** or **Off**.

User

Enter a username which the server should use when contacting the Telecommuting Module.

Password

Press the **Change password** button to enter a password for this user.

Authentication

Select the authentication algorithm to use for SNMP requests. 3Com VCX IP Telecommuting Module supports the **MD5** and **SHA-1** algorithms.

Privacy

Select whether the SNMP request should be encrypted using DES or not encrypted at all.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

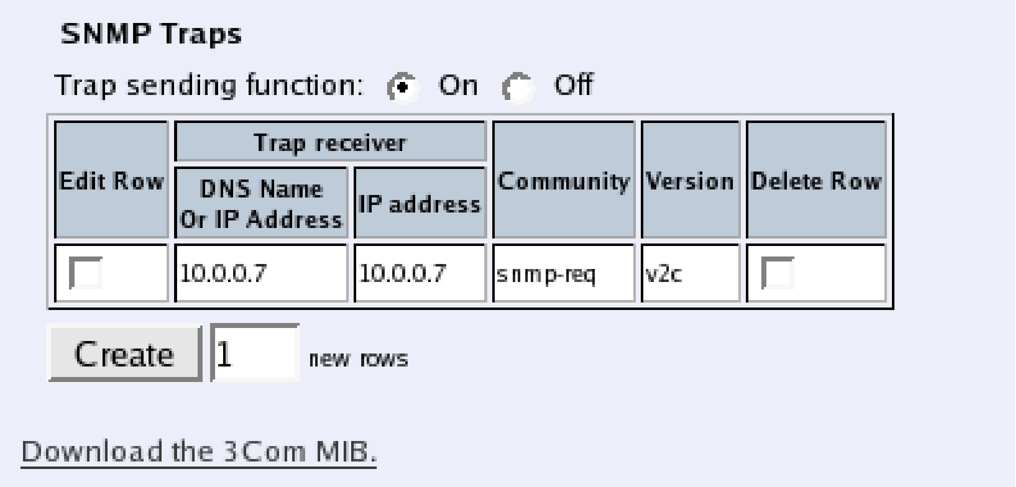
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

SNMP Traps

If **SNMP traps status** is On, the Telecommuting Module will send messages (traps) to the server(s) entered below whenever an SNMP authentication fails or the Telecommuting Module boots.

If the trap sending is disabled, no traps will be sent.



SNMP Traps

Trap sending function: ● On ○ Off

Edit Row	Trap receiver		Community	Version	Delete Row
	DNS Name Or IP Address	IP address			
□	10.0.0.7	10.0.0.7	snmp-req	v2c	□

Create 1 new rows

Download the 3Com MIB.

Trap sending

Select if trap sending (at boot and failed SNMP authentication) should be **On** or **Off**.

Trap receiver

Enter the IP address, or a name in the DNS, of the server to which the Telecommuting Module should send traps. If you enter a DNS name instead of an IP address, you must enter the IP address of a DNS server on the **Basic Configuration** page.

IP address shows the IP address of the **DNS name or IP address** you entered in the previous field.

Community

Enter the password (community) which the Telecommuting Module should use when sending traps. The community is sent unencrypted over the network.

Version

Select the SNMP version to be used for traps. You can select v1 or v2c.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Download the 3Com MIB

This link leads to the MIB (Management Information Base) definition for your 3Com VCX IP Telecommuting Module.

Save

Saves the SNMP configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

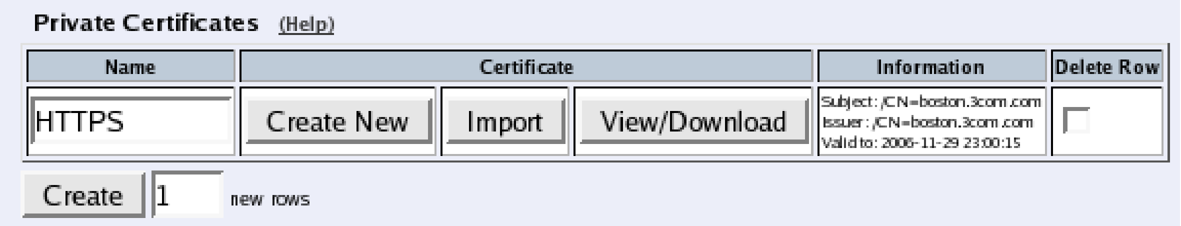
Certificates

Here, you create X.509 certificates for the Telecommuting Module, to be used for authentication in various applications, like when configuration over HTTPS is performed.

On this page you also upload CA certificates to the Telecommuting Module. For the base Telecommuting Module, CA certificates are not used.

Private Certificates

Here the private X.509 certificates of the Telecommuting Module are created. You can use the same certificate for all authentication purposes, or create different certificates for the various functions in the Telecommuting Module.



Private Certificates (Help)

Name	Certificate			Information	Delete Row
HTTPS	Create New	Import	View/Download	Subject: /CN=boston.3com.com Issuer: /CN=boston.3com.com Valid to: 2006-11-29 23:00:15	☐

Create 1 new rows

Name

Enter a name for this certificate. The name is only used internally in the Telecommuting Module.

Certificate

Create, import or download a private certificate. See more information about creating certificates below. Under **Import**, you upload Telecommuting Module certificates signed by an external CA.

Under **View/Download**, you download the private certificate, and you can also download the key pair.

Information

Information about this certificate, such as the signing CA and expiration date.

Delete Row

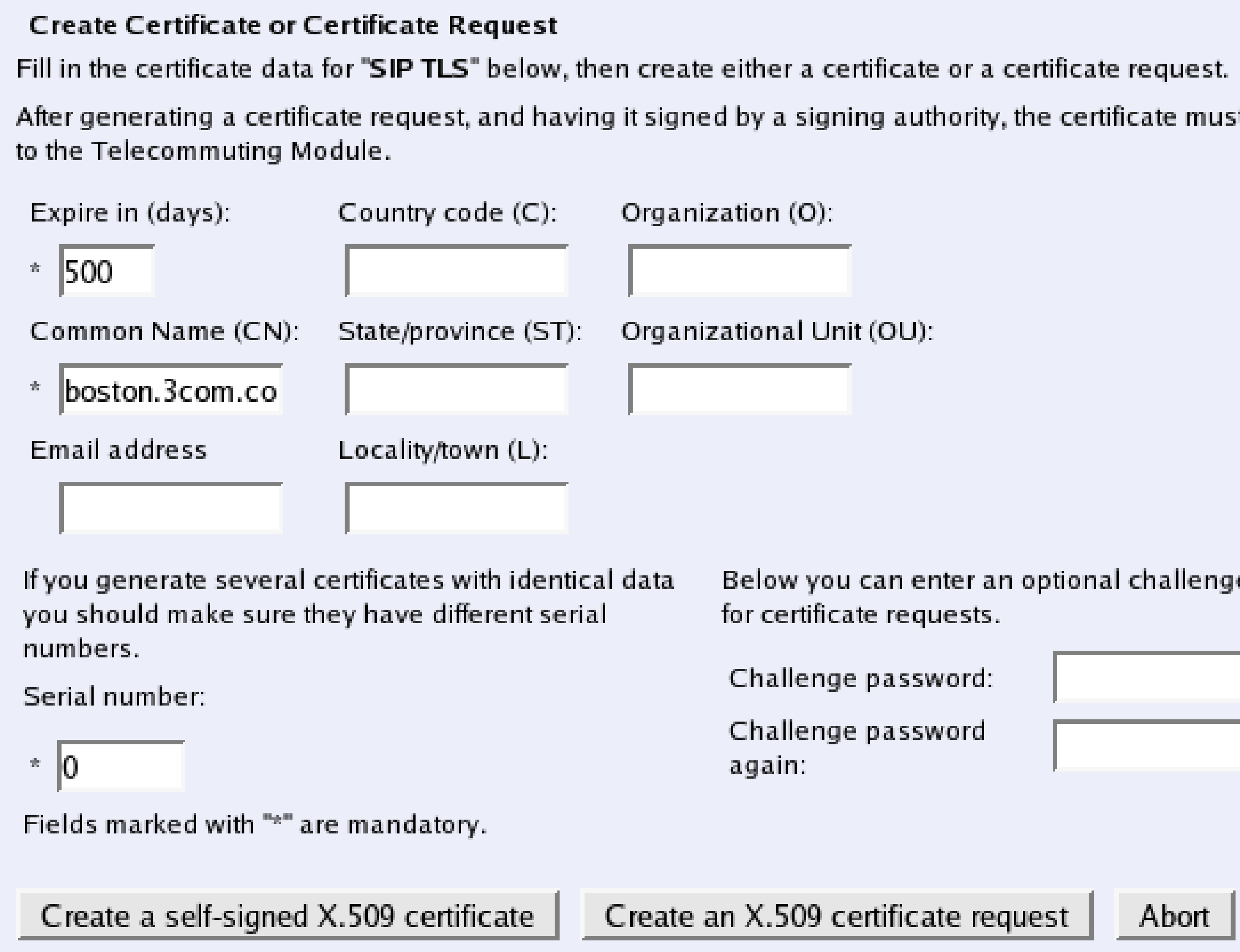
If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Create certificate or certificate request

Press **Create New** to create a new X.509 certificate. A new page with a form appears, requesting information about the Telecommuting Module. Fill in the form to apply for a certificate or create a self-signed certificate. Fields marked * are mandatory.



Create Certificate or Certificate Request

Fill in the certificate data for "**SIP TLS**" below, then create either a certificate or a certificate request.

After generating a certificate request, and having it signed by a signing authority, the certificate mus
to the Telecommuting Module.

Expire in (days): * 500

Country code (C):

Organization (O):

Common Name (CN): * boston.3com.co

State/province (ST):

Organizational Unit (OU):

Email address

Locality/town (L):

If you generate several certificates with identical data you should make sure they have different serial numbers.

Serial number: * 0

Fields marked with "*" are mandatory.

Below you can enter an optional challeng
for certificate requests.

Challenge password:

Challenge password again:

Create a self-signed X.509 certificate
Create an X.509 certificate request
Abort

Expire in

The expiration time defines how many days the certificate will last. Default time is 365 days, one year.

Common Name

Here, you enter the host name or IP address of the Telecommuting Module.

Email address

Enter the email address of the Telecommuting Module administrator.

Country code

Here, you enter the country code - not the top domain - for the country where the Telecommuting Module is located. The country code for the USA is US.

State/province

The state or province where the Telecommuting Module is located.

Locality/town

The city or town where the Telecommuting Module is located.

Organization

The name of the organization/company owning the Telecommuting Module.

Organizational Unit

The department using the Telecommuting Module.

Serial number

If you generate more than one certificate with the same information, and you want to give them separate names and treat them as different certificates, you need to give them different serial number. Enter a serial number for this certificate here.

Challenge password

Enter a password. This will be used only when revoking a signed certificate.

Create a self-signed X.509 certificate

By entering the requested information above and pressing this button, you can create a certificate that isn't signed by any certificate authority (CA). Self-signed certificates are for free, while certificates signed by an official CA normally are not. Certificates signed by CAs are automatically accepted by web browsers, while you have to accept self-signed certificates manually when using them in your web browser.

Create an X.509 certificate request

When pressing this button, you make a certificate request which can be sent to a certificate authority for signing. The request is downloaded under **View/Download** on the certificate page. The signed certificate is uploaded under **Import**.

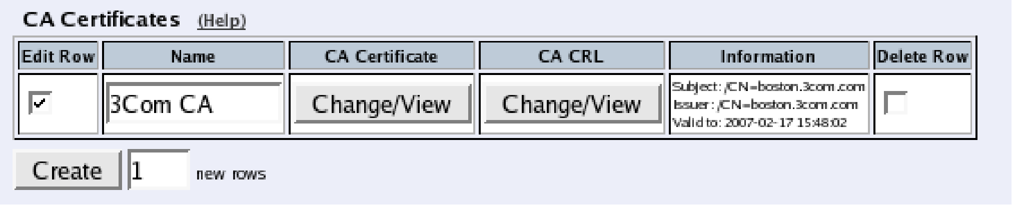
Abort

Press the **Abort** button to return to the **Certificates** page without creating a new certificate or certificate request.

CA Certificates

Here, you upload CA certificates and CRLs (Certificate Revocation Lists).

In the base Telecommuting Module, CAs and CRLs are not used.



CA Certificates (Help)

Edit Row	Name	CA Certificate	CA CRL	Information	Delete Row
☑	3Com CA	Change/View	Change/View	Subject: /CN=boston.3com.com Issuer: /CN=boston.3com.com Valid to: 2007-02-17 15:48:02	□

Create | 1 | new rows

Name

Enter a name for this CA certificate. The name is only used internally in the Telecommuting Module.

CA Certificate

You upload the CA certificate to the Telecommuting Module, inspect the current certificate, or download it to use somewhere else, by pressing the **Change/View** button.

CA CRL

A CRL (Certificate Revocation List) is used to tell the Telecommuting Module that some certificates issued by this CAs are not valid, even though they may not have expired yet. Upload a CRL for this CA by pressing the **Change/View** button.

Information

Information about this certificate, such as the signing CA and expiration date.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves all Certificates configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

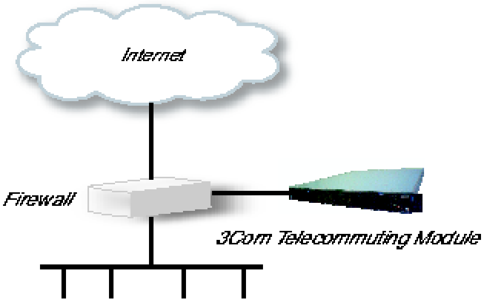
Telecommuting Module Type

The Telecommuting Module can be connected to your network in different ways, depending on your needs. On this page, you state what configuration you have.

The DMZ Configuration

Using this configuration, the Telecommuting Module is located on the DMZ of your firewall, and connected to it with only one interface.

This is the safest configuration, since all traffic goes through both your firewall and your Telecommuting Module. It is also the most flexible, since all networks connected to any of your firewall’s interfaces can be SIP-enabled.



On your firewall, you need to open the SIP port (normally UDP port 5060) and a range of UDP ports for RTP traffic between the Telecommuting Module and the Internet as well as between the Telecommuting Module and your internal networks. The SIP traffic finds its way to the Telecommuting Module using DNS or by setting the Telecommuting Module as an outbound proxy on the clients.

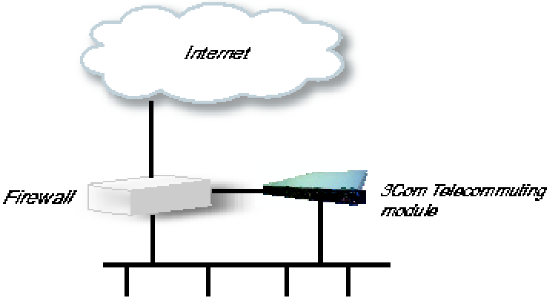
The firewall mustn’t use NAT for the traffic between the Telecommuting Module and your internal networks or for the traffic between the Telecommuting Module and the Internet. However, the Telecommuting Module can itself use NAT for traffic to the Internet.

You need to declare your internal network topology on the **Surroundings** page.

The DMZ/LAN Configuration

Using this configuration, the Telecommuting Module is located on the DMZ of your firewall, and connected to it with one of the interfaces.

This configuration is used to enhance the data throughput, since the traffic only needs to pass your firewall once.



On your firewall, you need to open the SIP port (normally UDP port 5060) and a range of UDP ports for RTP traffic between the Telecommuting Module and the Internet. The other interface is connected to your internal network. The Telecommuting Module can handle several networks on the internal interface even if they are hidden behind routers. No networks on other interfaces on the firewall can be handled.

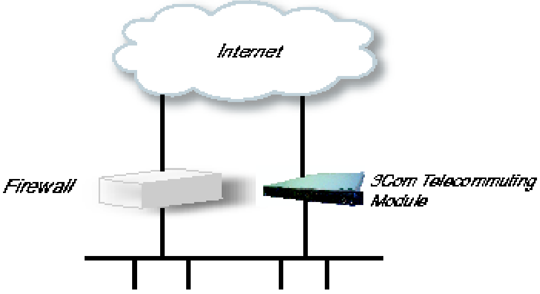
Internal users have to configure the Telecommuting Module as outbound proxy, or an internal proxy has to use the Telecommuting Module as outbound proxy.

The Telecommuting Module derives information about your network topology from the interface configuration.

The Standalone Configuration

Using this configuration, the Telecommuting Module is connected to your internal network on one interface and the outside world on the other.

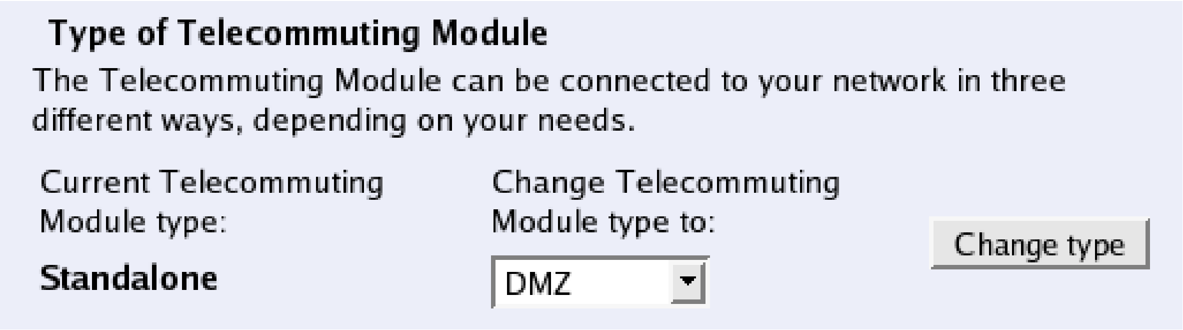
Use this configuration only if your firewall lacks a DMZ interface, or for some other reason cannot be configured for the DMZ or DMZ/LAN alternatives.



Internal users have to configure the Telecommuting Module as outbound proxy, or an internal proxy has to use the Telecommuting Module as outbound proxy. No change in the firewall configuration is needed.

The Telecommuting Module derives information about your network topology from the interface configuration.

Telecommuting Module Type configuration



Type of Telecommuting Module

The Telecommuting Module can be connected to your network in three different ways, depending on your needs.

Current Telecommuting Module type: **Standalone**

Change Telecommuting Module type to: DMZ

Current Telecommuting Module Type

Shows which type is currently active.

Change Telecommuting Module Type to

Select a new Telecommuting Module Type here.

Change type

Press the **Change type** button to set the new Telecommuting Module Type. This setting, like others, must be applied on the **Save/Load Configuration** page before it affects the Telecommuting Module functionality.

Chapter 7. Network Configuration

Under **Network**, you configure:

- Network groups which are used for the Telecommuting Module configuration
- The Telecommuting Module's IP addresses on all network interfaces
- Routings for the networks so that computers behind routers can be contacted
- VLAN settings
- The Telecommuting Module network environment (only for the DMZ type)

Networks and Computers

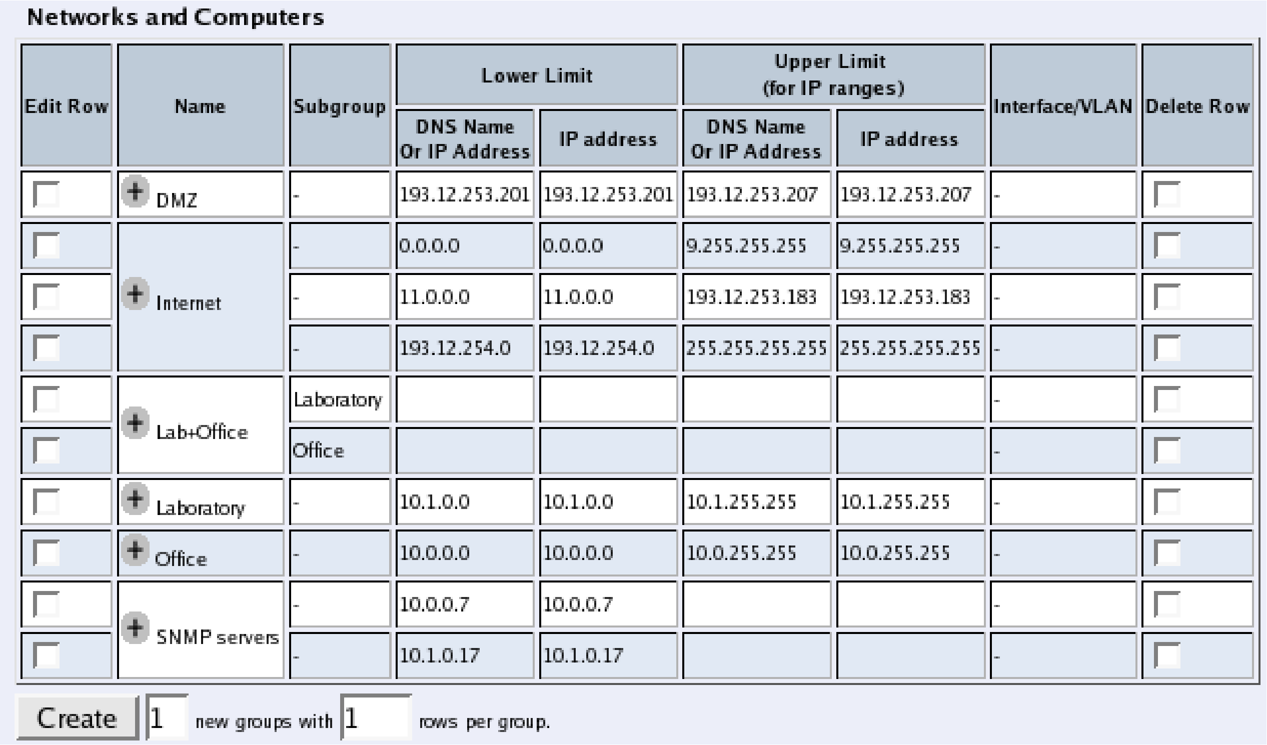
Here, you name groups of computers and networks. Sometimes it can be useful to give a group of computers a network name, such as Administration. If you want to group some computers, this can be done here, even if they do not have consecutive IP addresses. You can also include a subgroup when defining a new network group.

The names are used when you configure **Surroundings** and **SNMP**.

Every group of computers which can reach each other without having to pass through the *firewall* needs a separate network group.

The rows are sorted in alphabetical order, except that all upper case letters are sorted before lower case letters (B comes before a).

When using an already defined group as a subgroup, select the name of the group under **Subgroup**. Set **Interface/VLAN** to '-' and leave the other fields empty.



Networks and Computers

Edit Row	Name	Subgroup	Lower Limit		Upper Limit (for IP ranges)		Interface/VLAN	Delete Row
			DNS Name Or IP Address	IP address	DNS Name Or IP Address	IP address		
□	+ DMZ	-	193.12.253.201	193.12.253.201	193.12.253.207	193.12.253.207	-	□
□	+ Internet	-	0.0.0.0	0.0.0.0	9.255.255.255	9.255.255.255	-	□
□		-	11.0.0.0	11.0.0.0	193.12.253.183	193.12.253.183	-	□
□		-	193.12.254.0	193.12.254.0	255.255.255.255	255.255.255.255	-	□
□	+ Lab+Office	Laboratory					-	□
□		Office					-	□
□	+ Laboratory	-	10.1.0.0	10.1.0.0	10.1.255.255	10.1.255.255	-	□
□	+ Office	-	10.0.0.0	10.0.0.0	10.0.255.255	10.0.255.255	-	□
□	+ SNMP servers	-	10.0.0.7	10.0.0.7			-	□
□		-	10.1.0.17	10.1.0.17			-	□

Create 1 new groups with 1 rows per group.

Name

Enter a name for the group of computers. You can use this name when you change configuration on the pages mentioned above. A group can consist of several rows of IP addresses or series of IP addresses. By clicking on the plus sign beside the name, you add more rows where you can specify more IP addresses for this group.

Subgroup

An already defined group can be used as a subgroup to new groups. Select the old group here and leave the fields for **DNS name** empty. Select '-' as **Interface/VLAN**. If you don't want to use a subgroup, select '-' here.

Lower Limit

DNS Name Or IP Address

Enter the DNS name or IP address of the network or computer. For computers in an IP range that you want to give a network name, enter the first IP address in the range. **DNS Name Or IP Address** must not be empty if you are not using a subgroup.

IP Address

The IP address of the object you entered in the **DNS name or IP address** field is displayed here. This field is not updated until you click on **Look up all IP addresses again** or make changes in the **DNS Name Or IP Address** field.

Upper Limit

DNS Name Or IP Address

Here, enter the last DNS name/IP address of the network or group. If the network contains a single computer, you can leave this field empty. Then only the IP address in **Lower Limit** is used.

For computers in an IP range that you want to give a network name, enter the last IP address in the range. The IP address in **Upper Limit** must be at least as high as the one in **Lower Limit**. If you use a subgroup, leave this field empty.

IP Address

The IP address of the object you entered in the **DNS Name Or IP Address** field is displayed here. This field is not updated until you click on **Look up all IP addresses again** or make changes in the **DNS Name Or IP Address** field.

Interface/VLAN

Here, you can select an interface or a VLAN to restrict the IP range.

If the interface '-' is chosen, the group will consist of all IP addresses in the interval between **Lower limit** and **Upper limit**, regardless of what interface they are connected to. By selecting an interface or a VLAN, you constrain the group to consist only of the IP addresses in the interval that really are connected to the selected interface/VLAN.

For example, if 10.20.0.0 - 10.20.0.255 are IP addresses behind the interface DMZ-1 and the lower and upper limits are 10.10.10.20 and 255.255.255.255 respectively, choosing DMZ-1 as Interface will cause the group to consist of the IP addresses 10.20.0.0 - 10.20.0.255, being the IP addresses in the interval actually connected to the selected interface.

If you have selected a subgroup, the **Interface/VLAN** should be '-'.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new groups and rows you want to add to the table, and then click on **Create**.

Save

Saves the Networks and Computers configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and reset changes in old rows.

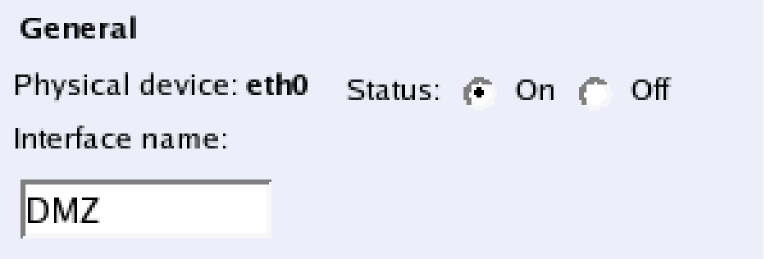
Interface (Network Interface 1 and 2)

There is a menu selection for each network interface (Network Interface 1 and 2) on the Telecommuting Module. Select a page to make configuration for that interface. There is also a page where configuration for all interfaces can be viewed and changed.

Here, you set the interface name, whether the interface is on or off, the IP address, alias, and static routing.

For each interface, go to **Directly Connected Networks** and state the IP address of the Telecommuting Module and the size of the network connected to this interface.

General



General

Physical device: eth0 Status: ● On ○ Off

Interface name:

DMZ

Physical device name

This tells the physical device name of the network interface. The physical interface **eth0** corresponds to Network Interface 1, and **eth1** corresponds to Network Interface 2.

Status

Specify if this network interface is **On** or **Off**. If the interface is off, all configuration on this page is ignored, and the Telecommuting Module will behave as if this interface wasn't present (except when used for failover).

If the interface should be used for failover, you should select **Off**. In this case, it won't be available for other traffic than the synchronizing within the failover team. Read more about failover in chapter 12, Failover.

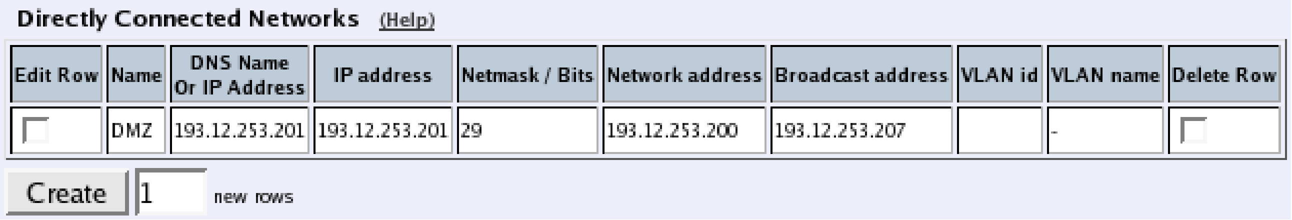
Interface name

The network **Interface name** is only used internally in the Telecommuting Module, e. g. when configuring **Networks and Computers**.

Directly Connected Networks

The Telecommuting Module must have an IP address on every network to which it is directly connected. This applies to all networks on the same physical network to which this interface is connected.

Note that the interface which should receive traffic from the outside must have a public IP address (no NAT), regardless of which **Telecommuting Module Type** was selected. For a DMZ or DMZ/LAN type, this means that the interface connected to the DMZ of the firewall must have a public IP address.



Directly Connected Networks (Help)

Edit Row	Name	DNS Name Or IP Address	IP address	Netmask / Bits	Network address	Broadcast address	VLAN id	VLAN name	Delete Row
□	DMZ	193.12.253.201	193.12.253.201	29	193.12.253.200	193.12.253.207		-	□

Name

A name for this IP address. You can use this name when configuring the administration IP address. This name is only used internally in the Telecommuting Module.

DNS name or IP address

The name/IP address of the Telecommuting Module on this network interface on this directly connected network.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Netmask/bits

Enter the mask of the network where the **DNS name or IP address** applies.

Network address

The IP address of the network where the **DNS name or IP address** applies.

Broadcast address

Shows the broadcast address of the network in the **Network address** field.

VLAN id

VLANs are used for clustering IP ranges into logical networks.

A VLAN id is simply a number, which identifies the VLAN uniquely within your network.

Enter a VLAN id for this network. You don’t need to use a named VLAN (defined on the **VLAN** page).

VLAN name

If you entered the VLAN id of a named VLAN, the name will show here.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

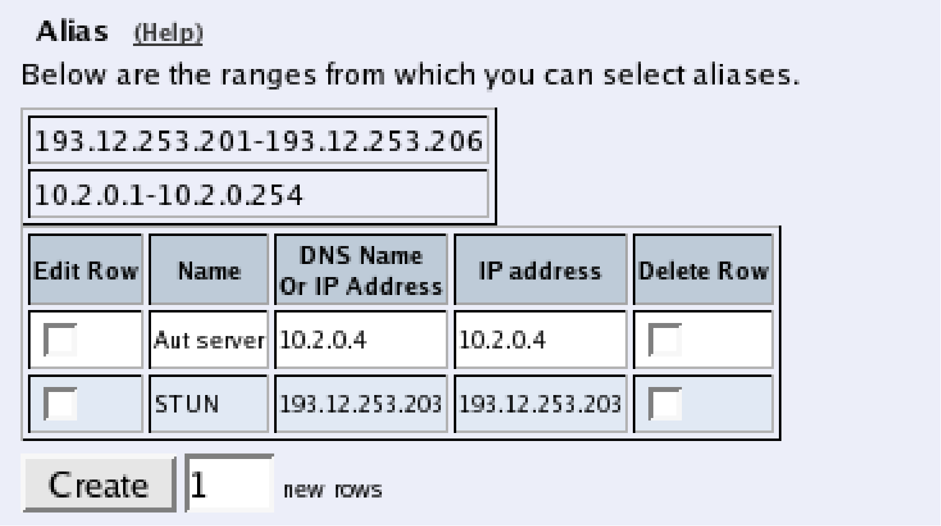
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Alias

3Com VCX IP Telecommuting Module can use extra IP addresses, aliases, on its interfaces. All alias IP addresses must belong to one of the **Directly Connected Networks** you have specified.

Aliases are necessary for setting up a STUN server.



Alias (Help)

Below are the ranges from which you can select aliases.

193.12.253.201-193.12.253.206

10.2.0.1-10.2.0.254

Edit Row	Name	DNS Name Or IP Address	IP address	Delete Row
□	Aut server	10.2.0.4	10.2.0.4	□
□	STUN	193.12.253.203	193.12.253.203	□

Name

Enter the name of your alias. This name is only used internally in the Telecommuting Module.

DNS name or IP address

Enter the IP address of this alias, or a name in the DNS. If you enter a DNS name instead of an IP address, you must enter the IP address of a DNS server on the **Basic Configuration** page.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

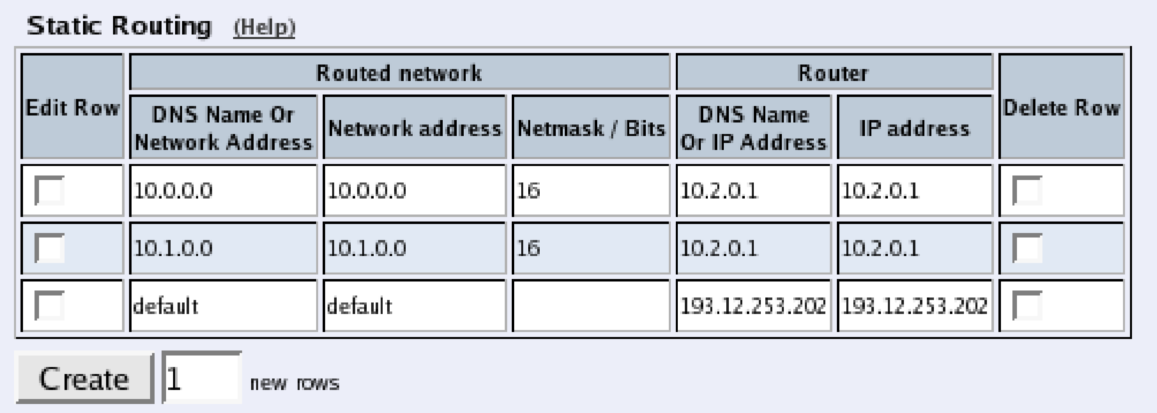
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Static routing

If there is a router between the Telecommuting Module and a computer network which the Telecommuting Module is serving, you must name the router and the network here. The table is sorted by network number and network mask.

The **Default gateway**, configured on the **Basic Configuration** page, will automatically be entered in this table on the corresponding interface page, when added to the **Default Gateways** table.



Static Routing (Help)

Edit Row	Routed network			Router		Delete Row
	DNS Name Or Network Address	Network address	Netmask / Bits	DNS Name Or IP Address	IP address	
□	10.0.0.0	10.0.0.0	16	10.2.0.1	10.2.0.1	□
□	10.1.0.0	10.1.0.0	16	10.2.0.1	10.2.0.1	□
□	default	default		193.12.253.202	193.12.253.202	□

Routed network

Enter the DNS name or IP address of the routed network under **DNS name or network address**.

The IP address of the routed network is shown under **Network address**.

In the **Netmask** field, enter the netmask of the network.

Router

The name or IP address of the router that will be used for routing to the network. If there are several routers between the Telecommuting Module and the network, fill in the router *closest to the Telecommuting Module*.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves all Interface configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

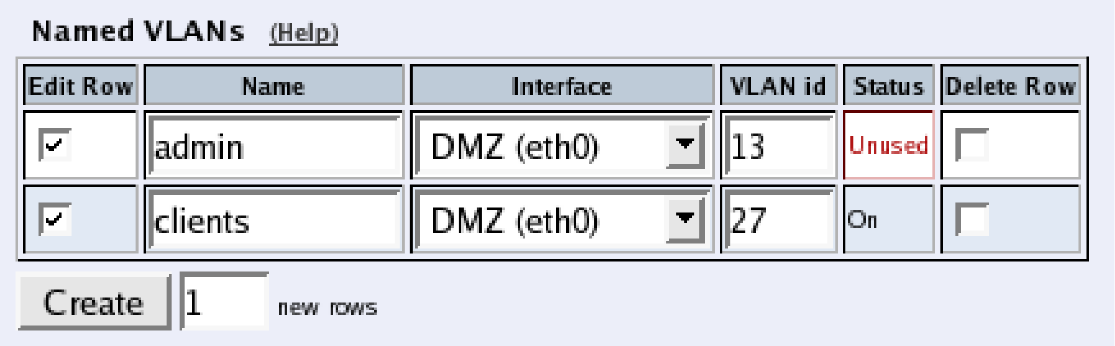
VLAN

VLANs are used for clustering IP ranges into logical networks.

A VLAN id is simply a number, which identifies the VLAN uniquely within your network.

Here, you can list the VLANs you wish to use and give them names, to make administration easier.

Named VLANs can also be selected instead of interfaces on the **Networks and Computers** page.



Named VLANs (Help)

Edit Row	Name	Interface	VLAN id	Status	Delete Row
☑	admin	DMZ (eth0)	13	Unused	□
☑	clients	DMZ (eth0)	27	On	□

Name

The name of this VLAN. The name is only used in the Telecommuting Module web interface to help you keep track of the different VLANs.

Interface

Select an interface for this VLAN.

VLAN id

Enter a VLAN id. A VLAN id is just a number. All packets for this VLAN is then marked with this number, enabling all network devices to recognize and route packets for the VLAN.

Status

The status for this VLAN. Status can be **On** (the VLAN is used on an active interface), **Off** (the VLAN is used on an inactive interface) and **Unused** (no **Directly Connected Networks** has been selected for this VLAN).

Delete Row

If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

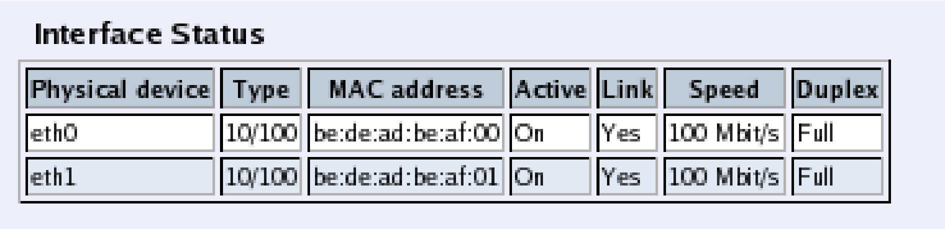
Saves all VLAN configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Interface Status

On this page, status about the physical interfaces and links are shown.



Interface Status

Physical device	Type	MAC address	Active	Link	Speed	Duplex
eth0	10/100	be:de:ad:be:af:00	On	Yes	100 Mbit/s	Full
eth1	10/100	be:de:ad:be:af:01	On	Yes	100 Mbit/s	Full

Physical device

This tells the physical device name of the network interface. The physical interface **eth0** corresponds to Network Interface 1, and **eth1** corresponds to Network Interface 2.

Type

Here the speed options for the interface are shown.

MAC address

The MAC address of the interface.

Active

Shows if the interface is activated or not.

Link

Here you can see if the interface has physical link to the network.

Speed

Here you can see the negotiated speed on the interface network.

Duplex

Here you can see the negotiated duplex for the interface.

Surroundings

Settings on the **Surroundings** page are only required when the Telecommuting Module has been made the **DMZ** type.

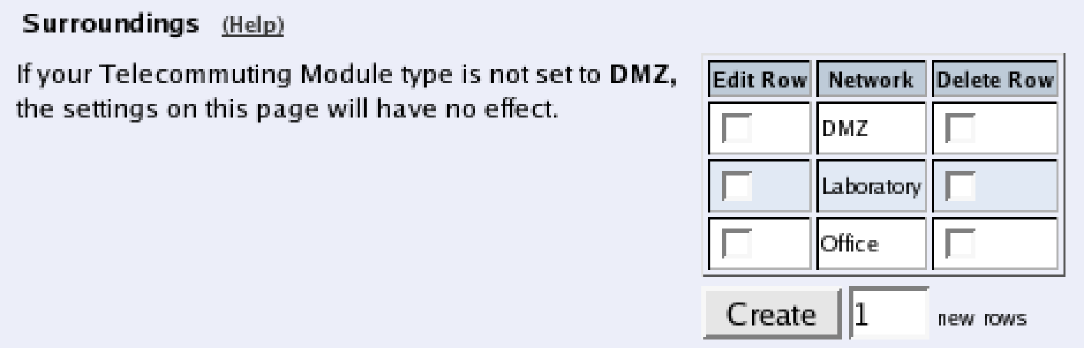
The Telecommuting Module must know what the networks around it looks like. On this page, you list all networks which the Telecommuting Module should serve and which are not reached through the default gateway of the *firewall*.

All computers that can reach each other without having to go through the firewall connected to the Telecommuting Module should be grouped in one network. When you are finished, there should be one line for each of your firewall’s network connections (not counting the default gateway).

One effect of this is that traffic between two users on different networks, or between one of the listed networks and a network not listed here, is NAT:ed.

Another effect is that for connections between two users on the same network, or on networks where neither is listed in Surroundings, no ports for RTP sessions will be opened, since the Telecommuting Module assumes that they are both on the same side of the firewall.

Normally, at least one network should be listed here. If no networks are listed, the Telecommuting Module will not perform NAT for any traffic.



Surroundings (Help)

If your Telecommuting Module type is not set to **DMZ,** the settings on this page will have no effect.

Edit Row	Network	Delete Row
□	DMZ	□
□	Laboratory	□
□	Office	□

1 new rows

Network

Select a network. The alternatives are the networks you defined on the **Networks and Computers** page.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves all Surroundings configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Chapter 8. SIP Services

SIP (Session Initiation Protocol) is a protocol for creating and terminating various media stream sessions over an IP network. It is for example used for Internet telephone calls and distribution of video streams.

SIP takes care of the initiation, modification and termination of a session with one or more participants. The protocol makes it possible for the participants to agree on what media types they should share. You can find more information about SIP in appendix A, More About SIP, and in RFC 3261.

You find examples on how to configure your 3Com VCX IP Telecommuting Module for SIP in chapter 4, How To Configure SIP.

The SIP module in 3Com VCX IP Telecommuting Module handles SIP requests for users who have registered on a machine connected to the Telecommuting Module. The module forwards the request through the Telecommuting Module, which enables users behind different network interfaces to make contact. The SIP module controls the security rules to temporarily let through the media streams that the users agree on, on their assigned ports.

You must enter a **DNS server** and a **Default gateway** on the **Basic Configuration** page to make the SIP module work satisfactorily.

Administration of SIP

To enable the SIP function of the Telecommuting Module, you must at least configure on the **Basic** page.

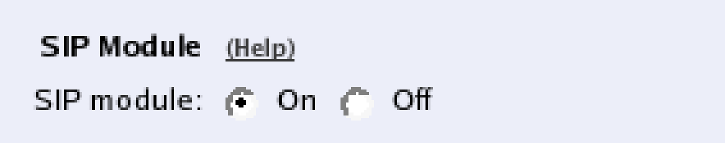
These SIP functions are configured in the **SIP Services** section:

- SIP module on/off.
- SIP logging.
- Port range for SIP media.
- Interoperability settings.
- SIP timeouts.
- Remote SIP Connectivity (requires a Remote SIP Connectivity Module).

Basic

Here, you make basic settings for the Telecommuting Module SIP management.

General



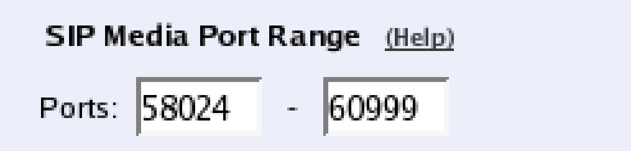
SIP Module (Help)

SIP module: ● On ○ Off

Here, select whether the SIP module should be activated or not. If you select to turn the SIP module **Off**, no other SIP settings will have any effect.

SIP media port range

State a port interval which the Telecommuting Module should use for SIP media streams. You can use any high ports except 4500 (reserved for NAT-T) and 65097-65200 (reserved for RADIUS).



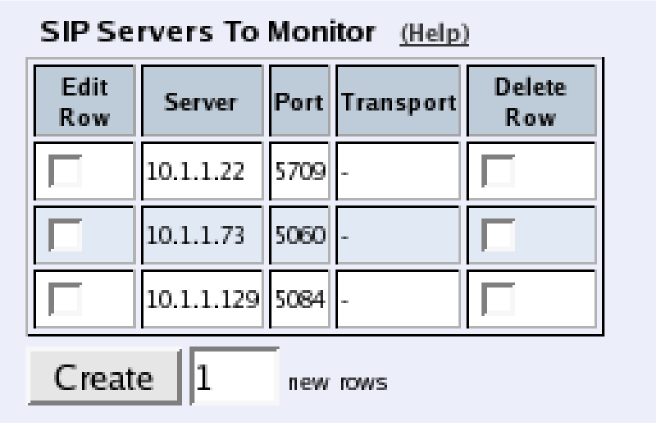
SIP Media Port Range (Help)

Ports: 58024 - 60999

Enter the lower and upper limit of the port range that the Telecommuting Module should use for media streams. The upper limit must be at least as high as the lower limit.

SIP Servers To Monitor

Your Telecommuting Module can be made to monitor SIP servers, to check that they are alive. The information is used by the Telecommuting Module when SIP signaling should be passed on to the server in question. This is useful when a domain resolves to several individual hosts; the Telecommuting Module will know immediately if one of them is down, which will speed up the call connection.



SIP Servers To Monitor (Help)

Edit Row	Server	Port	Transport	Delete Row
□	10.1.1.22	5709	-	□
□	10.1.1.73	5060	-	□
□	10.1.1.129	5084	-	□

Server

Enter the host name, domain name, or IP address of the server to be monitored.

Port

Enter the port to be monitored on that host. This should be the port to use for SIP signaling.

Transport

Select the transport to be monitored on that host. This should be the transport to use for SIP signaling.

Delete Row

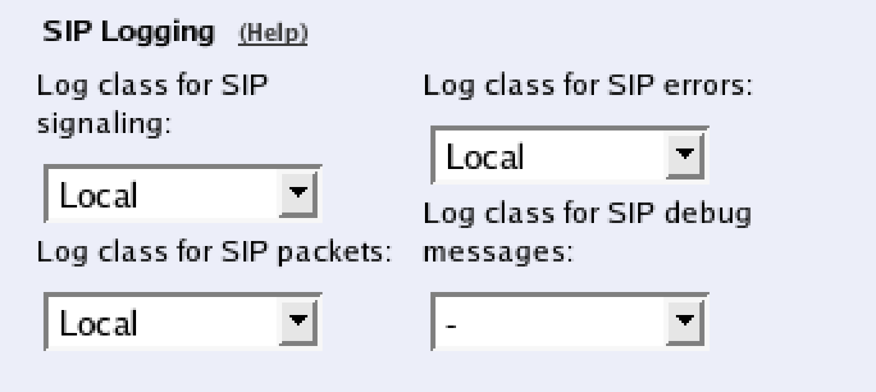
If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Logging

The same settings can also be found on the **Logging Configuration** page under **Logging**.



SIP Logging (Help)

Log class for SIP signaling: Local

Log class for SIP errors: Local

Log class for SIP packets: Local

Log class for SIP debug messages: -

Log class for SIP errors

The Telecommuting Module sends a message if there are any SIP errors. Select a log class for these log messages.

Log class for SIP signaling

For each SIP packet, the Telecommuting Module generates a message, containing the sender and receiver of the packet and what type of packet it is. Select a log class for these log messages.

Log class for SIP packets

The Telecommuting Module logs all SIP packets (one SIP packet is many lines). Select a log class for the SIP packets.

Log class for SIP debug messages

The Telecommuting Module logs a lot of status messages, for example the SIP initiation phase of a reboot. Select a log class for these messages.

Save

Saves the Basic configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Interoperability

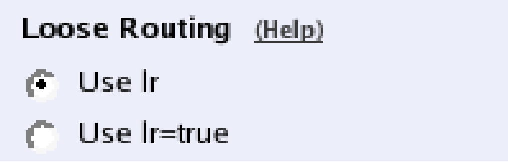
The SIP standard is still young and under considerable development. As an effect, several implementations of the standard omits parts of it, or makes guesses as to what will be accepted.

3Com VCX IP Telecommuting Module adheres rather well to the standard (RFC 3261) per default, but you can also adjust the configuration to make more allowing for known issues in various SIP implementations.

On this page, you also configure timeout and retransmission values for SIP signaling.

Loose routing

The Telecommuting Module uses the parameter "lr" in its SIP signaling to announce to other SIP devices that it uses loose routing. Some other SIP implementations incorrectly expect the lr parameter to be followed by a value, i.e. "lr=true". If you select that the Telecommuting Module should add this value to its SIP signaling, it will work with these implementations, too. This could affect its interaction with other SIP devices that conform to the SIP standard very strictly.



Loose Routing (Help)

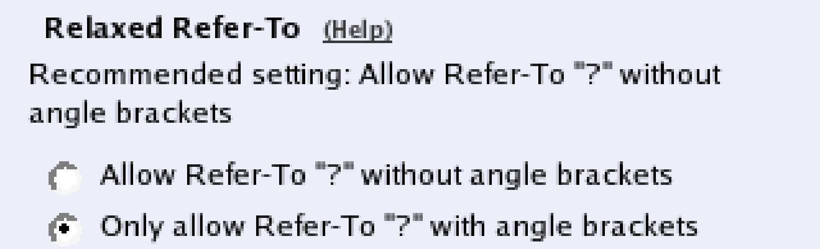
● Use lr

○ Use lr=true

Select to use **lr** or **lr=true**.

Relaxed Refer-To

The SIP standard requires that a Refer-To header with a question mark in it must be contained within angle brackets. Some clients do not honor this.



Relaxed Refer-To (Help)

Recommended setting: Allow Refer-To "?" without angle brackets

○ Allow Refer-To "?" without angle brackets

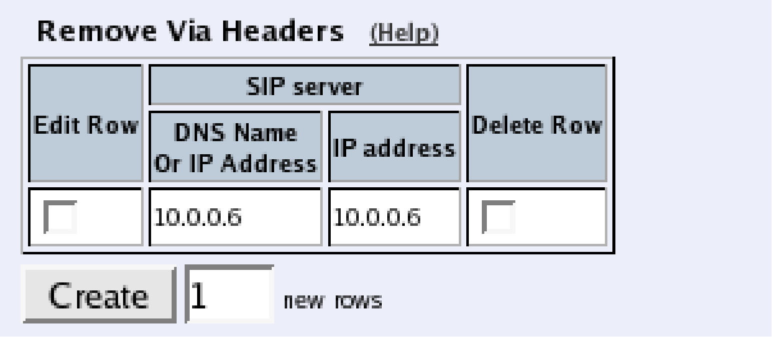
● Only allow Refer-To "?" with angle brackets

Select whether the Telecommuting Module should accept Refer-To headers without angle brackets, but containing question marks. The recommended setting is **Only allow Refer-To ? with angle brackets**.

Remove VIA headers

Some SIP servers won’t accept requests with more than one Via header. To be able to communicate via these servers, you can select to remove all Via headers but one in requests to those servers. The Via headers are added again when the reply passes the Telecommuting Module.

Here, list servers that won’t accept more than one Via header in SIP requests.



Remove Via Headers (Help)

Edit Row	SIP server		Delete Row
	DNS Name Or IP Address	IP address	
□	10.0.0.6	10.0.0.6	□

SIP server

Enter the DNS name or IP address for a SIP server that won’t accept more than one Via header.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

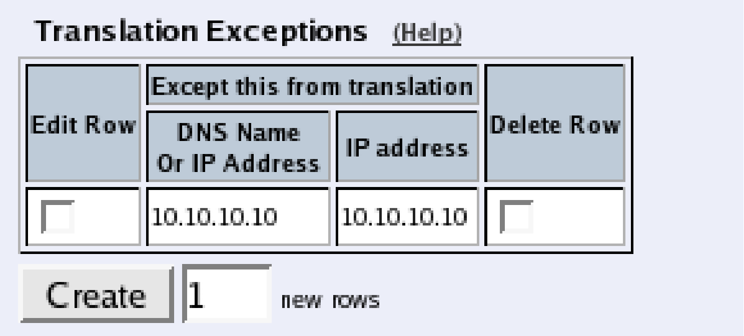
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Translation exceptions

Usually, the Telecommuting Module rewrites IP addresses in the SIP signaling to hide it for the receiver. For some reasons, you might want to except certain IP addresses from being rewritten. Enter those IP addresses in the table.

If you use a dialing domain that looks like an IP address (like 10.10.10.10), you need to enter that domain in this table.



Translation Exceptions (Help)

Edit Row	Except this from translation		Delete Row
	DNS Name Or IP Address	IP address	
□	10.10.10.10	10.10.10.10	□

Except this from translation

Enter the DNS name or IP address to be excepted from IP address translation. If you enter a DNS name, the corresponding IP address will be excepted from translation.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

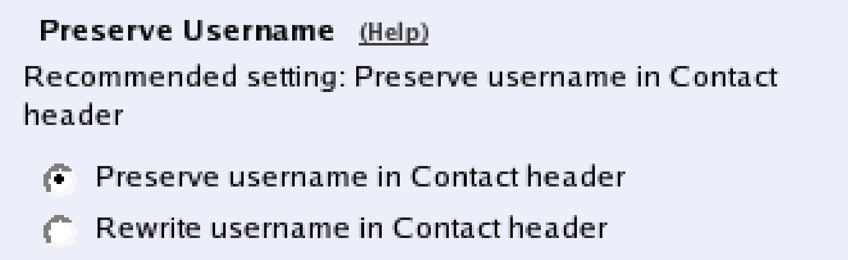
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Preserve username

When registering a SIP client on one side of the Telecommuting Module to a SIP server on the other side, the Contact header is normally rewritten. By doing this, we make it possible for the SIP server to track when the same user is registering multiple times from different places. It is possible to turn this rewriting off and preserve the username in Contact headers passing through the Telecommuting Module, but that makes it impossible for the SIP server to tell if registrations for a certain user belong to one or several clients (if a user has two registrations from different clients and deregisters one of them, the SIP server will delete its only registration for him).

To make all calls work, you need to turn this On.



Preserve Username

Recommended setting: Preserve username in Contact header

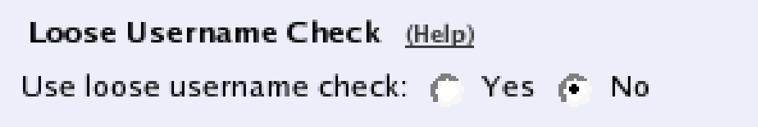
● Preserve username in Contact header

○ Rewrite username in Contact header

Select if usernames should be preserved or not. The recommended setting is to **Preserve username in Contact header**.

Loose username check

Normally, the Telecommuting Module checks that the authentication username equals the username in the From header. Some clients use their whole address as authentication username (ie: user@host.com), which means that the username "user" in the From header is compared with the authentication username "user@host.com". This authentication will fail. With this function, "@host.com" is stripped from the authentication username.



Loose Username Check

Use loose username check: ○ Yes ● No

Select if usernames should be checked loosely (**Yes**) or strictly (**No**).

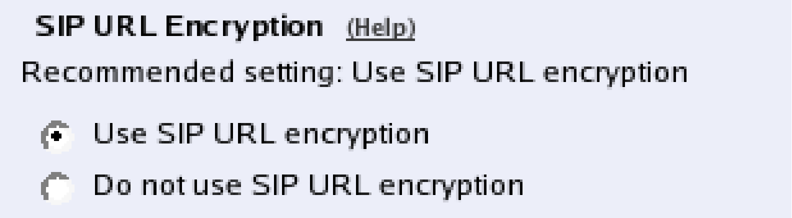
SIP URL encryption

In some situations some SIP URLs are encrypted and signed. When an invitation to a call is sent out, the address that the callee is to send its answer to is encrypted, if the outgoing packet is NAT:ed. When the answer from the callee comes in, the Telecommuting Module checks that the encryption and signing is correct before the address is used to send the information onwards.

The encryption and signing makes the SIP packets slightly larger. This might lead to SIP packets being fragmented. By turning encryption off, fragmentation can be avoided in some cases, and since some equipment has trouble with fragmented packets this can sometimes be necessary.

Please note that when encryption is turned off, the Telecommuting Module maked no checks of incoming SIP URLs. It becomes possible in theory to trick the Telecommuting Module to send SIP packets anywhere, which means that security is drastically reduced if encryption is turned off.

If Remote NAT Traversal is used, the URL encryption must be turned on.



SIP URL Encryption (Help)

Recommended setting: Use SIP URL encryption

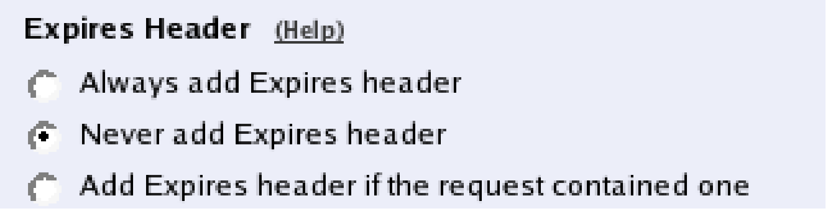
● Use SIP URL encryption

○ Do not use SIP URL encryption

Here, you select if SIP URL encryption should be used or not.

Expires header

Some SIP clients don't understand the expires: parameter in the Contact header. To set the expiration time for those clients, you can make the Telecommuting Module add to REGISTER request replies an Expires header with the expires value in it.



Expires Header (Help)

○ Always add Expires header

● Never add Expires header

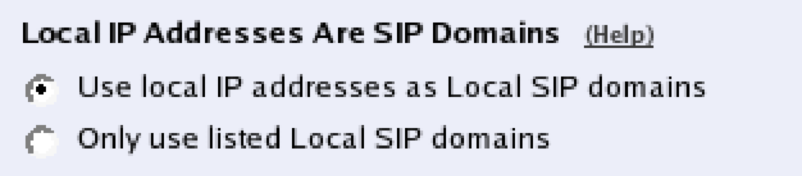
○ Add Expires header if the request contained one

Select to **Always add Expires header**, **Never add Expires header**, or **Add Expires header if the request contained one**. The last means that the Telecommuting Module will add an Expires header to the response if the request from the client contained one.

Local IP Addresses Are SIP Domains

Your 3Com VCX IP Telecommuting Module can be made to use all its local IP addresses as local SIP domains, in addition to the domains listed on the **User database** page.

This setting have impact on all functions where distinctions can be made between local and other domains, like the **SIP Methods** and the **Matching Request-URI**.



Local IP Addresses Are SIP Domains (Help)

● Use local IP addresses as Local SIP domains

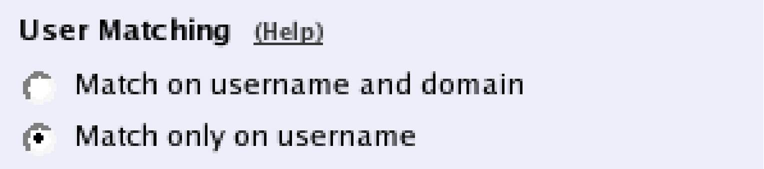
○ Only use listed Local SIP domains

Select if the Telecommuting Module should regard all its own IP addresses on all interfaces as local SIP domains.

User Matching

Here, you can select to match on username only or username as well as domain.

If you match on username only, users with the same username will be treated as the same, even when they are under different domains.



User Matching (Help)

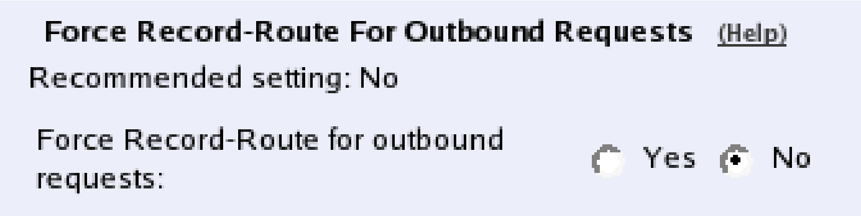
○ Match on username and domain

● Match only on username

Force Record-Routing For Outbound Requests

Here, you select if the Telecommuting Module should add a Record-Route header to all requests received by the Telecommuting Module, but whose Request-URI does not contain one of its **Local SIP Domains**.

The Record-Route header makes all subsequent SIP signaling for this session to be routed via the Telecommuting Module even if it is not the shortest route.



Force Record-Route For Outbound Requests (Help)

Recommended setting: No

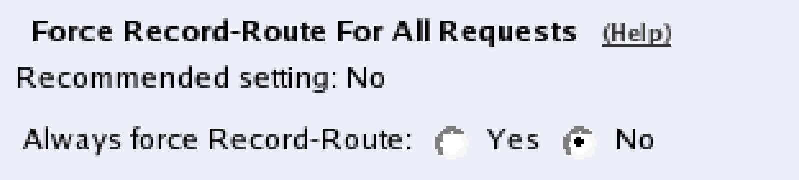
Force Record-Route for outbound requests: ○ Yes ● No

Here, you select to add Record-Route headers for outbound requests or not.

Force Record-Route For All Requests

Here, you select if the Telecommuting Module should add a Record-Route header to all requests received by the Telecommuting Module, which should be passed on to another client/server.

The Record-Route header makes all subsequent SIP signaling for this session to be routed via the Telecommuting Module even if it is not the shortest route.



Force Record-Route For All Requests (Help)

Recommended setting: No

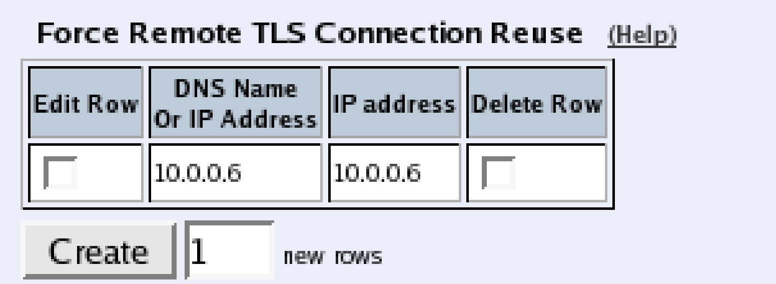
Always force Record-Route: ○ Yes ● No

Here, you select to add Record-Route headers for all requests or not.

Force remote TLS connection reuse

Enter SIP servers to which the Telecommuting Module connects using TLS. For the listed servers, the Telecommuting Module will use the actual source port for the TLS connection instead of port 5061.

This is useful in the SIP signaling, where port numbers are used in Via and Route headers.



Force Remote TLS Connection Reuse (Help)

Edit Row	DNS Name Or IP Address	IP address	Delete Row
□	10.0.0.6	10.0.0.6	□

DNS name or IP address

Enter the DNS name or IP address for a SIP server for which the Telecommuting Module should reuse TLS ports.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Delete Row

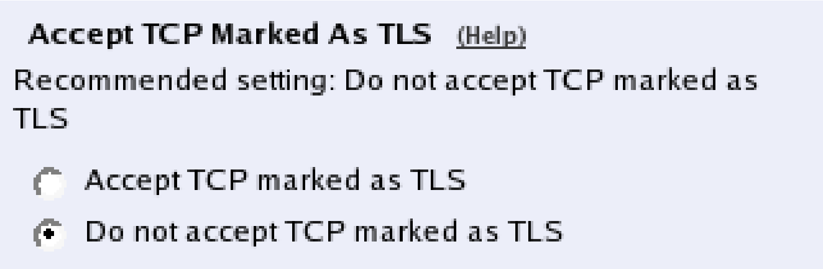
If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Accept TCP Marked As TLS

When a TLS accelerator is used, SIP packets can be sent to the Telecommuting Module via TCP, but the packet content will look as if TLS was used.



Accept TCP Marked As TLS

Recommended setting: Do not accept TCP marked as TLS

○ Accept TCP marked as TLS

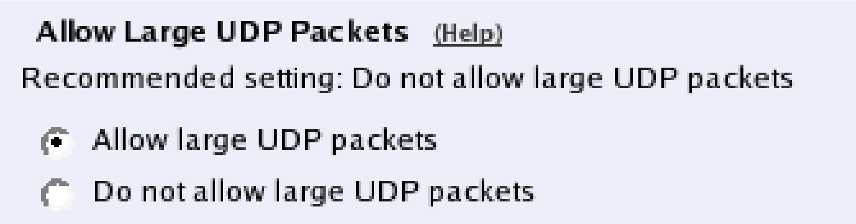
● Do not accept TCP marked as TLS

Select if TCP packets with TLS content should be accepted. The recommended setting is not to accept them.

Allow Large UDP Packets

Sometimes, the SIP signaling UDP packets get larger than the standard allows. There are two ways to handle this; either send large UDP packets, which may become fragmented into several packets, or use TCP. Some SIP devices may not be able to receive TCP packets, which means that you have to allow large UDP packets, but to do this violates section 18.1.1 in RFC 3261.

This setting only affects SIP signaling packets.



Allow Large UDP Packets

Recommended setting: Do not allow large UDP packets

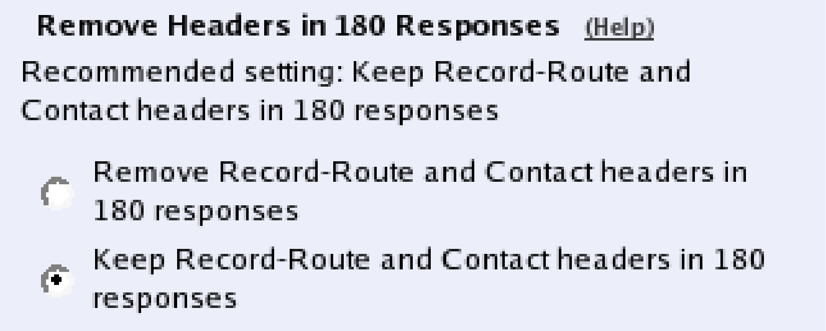
● Allow large UDP packets

○ Do not allow large UDP packets

Select if large UDP packets should be allowed. The recommended setting is not to allow them.

Remove Headers in 180 Responses

Some SIP servers require that the Contact and Record-Route headers are removed from 180 responses.



Remove Headers in 180 Responses

Recommended setting: Keep Record-Route and Contact headers in 180 responses

○ Remove Record-Route and Contact headers in 180 responses

● Keep Record-Route and Contact headers in 180 responses

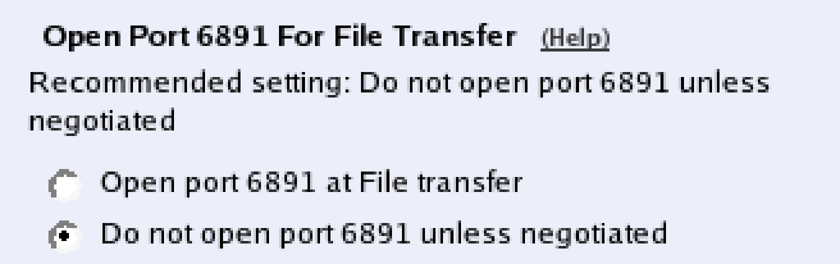
Select if the Telecommuting Module should remove these headers in 180 responses. The recommended setting is to keep the headers.

Open port 6891 for file transfer

Messenger clients do not always use the ports that are negotiated in the SIP signaling. In particular, the File Transfer function always uses the same port, regardless of what is negotiated. To make File Transfer work through the Telecommuting Module you must open port 6891, the Messenger File Transfer port.

You only need to do this if File Transfers are made between clients on different networks; if transfers are always only made between clients on the same network, no extra ports need to be opened.

Note: If more than one Messenger client performs file transfer through the Telecommuting Module at the same time, they could end up sending to each other's peers instead of their own. An attacker could possibly use this to intercept transfered files; don't use this mechanism to transfer sensistive data.



Open Port 6891 For File Transfer (Help)

Recommended setting: Do not open port 6891 unless negotiated

○ Open port 6891 at File transfer

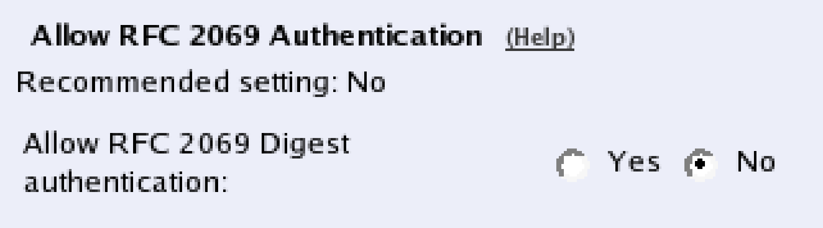
● Do not open port 6891 unless negotiated

Here, you select to turn Open port 6891 **On** or **Off**. Recommended setting is Off.

Allow RFC 2069 authentication

Some SIP units can't handle Digest authentication as described in RFC 2617, but they still do authentication. 3Com VCX IP Telecommuting Module can allow the simpler form of authentication described in RFC 2069 to be able to interoperate with these units.

To allow this can decrease security. Use it only if units in your system need it.



Allow RFC 2069 Authentication (Help)

Recommended setting: No

Allow RFC 2069 Digest authentication: ○ Yes ● No

Select if authentication according to RFC 2069 should be allowed (**On**) or not (**Off**). It is recommended to keep this setting off.

Save

Saves the Interoperability configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

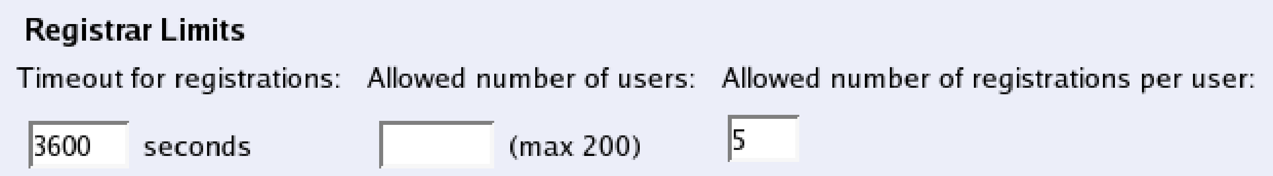
Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

Sessions and Media

Here, settings are made for the SIP timeouts and sessions negotiated via the Telecommuting Module.

Registrar Limits



Registrar Limits

Timeout for registrations:	Allowed number of users:	Allowed number of registrations per user:
3600 seconds	(max 200)	5

Timeout for registrations

Enter the timeout (in seconds) before a registration becomes obsolete. When the timeout is reached, the registrar discards the registration.

Allowed number of users

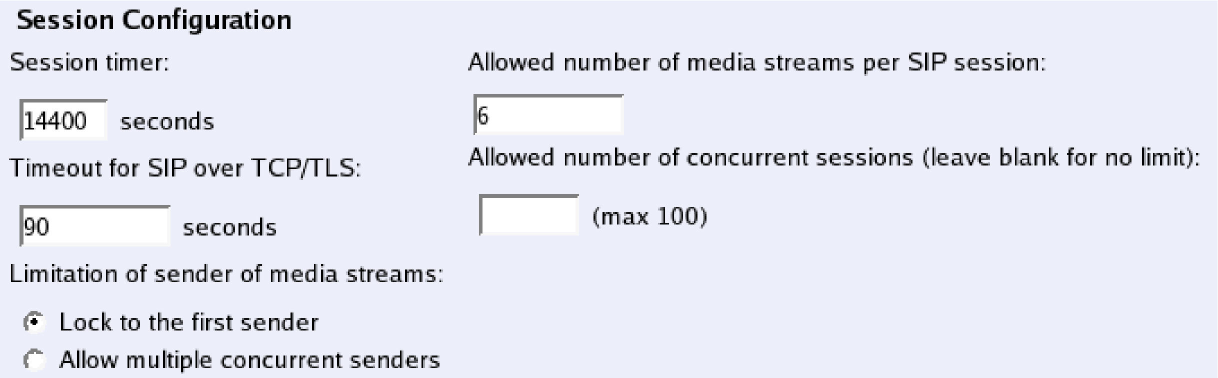
Enter the maximum number of users allowed to register in the SIP registrar.

Leave the field empty to allow as many registrations as there are SIP user licenses on the Telecommuting Module (number displayed inside parantheses). You can purchase additional SIP user licenses from your retailer.

Allowed number of registrations per user

Enter the allowed number of concurrent registrations for a user. A registration looks like *user@computer*, which means that if you re-register from the same computer, this won't count as another registration, but just an update.

Session Configuration



Session Configuration

Session timer: 14400 seconds

Timeout for SIP over TCP/TLS: 90 seconds

Limitation of sender of media streams:

● Lock to the first sender

○ Allow multiple concurrent senders

Allowed number of media streams per SIP session: 6

Allowed number of concurrent sessions (leave blank for no limit): (max 100)

Session timer

Enter the maximum time for a SIP initiated connection. When the timeout is reached, the Telecommuting Module discards the media streams. The clients won't notice, as the connection is still active, but you won't hear anything as no media streams are let through. To avoid this, clients can regularly ask for new timeouts.

Timeout for SIP over TCP/TLS

The **Timeout for SIP over TCP/TLS** decides how long a SIP connection over TCP with the Telecommuting Module may exist without having received a complete SIP request.

"0" or an empty field means that SIP over TCP or TLS cannot be used to the Telecommuting Module.

Limitation of sender of media streams

The Telecommuting Module usually locks a media stream to the first sender IP address and port (for security reasons). Some SIP clients change ports during the first media stream packets, which will block the media stream from being let through the Telecommuting Module. There are also scenarios where the media stream sender is changed to an entirely new sender.

You can select for the Telecommuting Module to **Lock to the first sender**, which will render the behaviour described above. **Allow multiple concurrent senders** lets the media stream through even if ports and/or IP addresses change.

Allowed number of media streams per SIP session

Enter the number of media streams a single SIP session can handle. This restriction is primarily made for preventing DOS attacks.

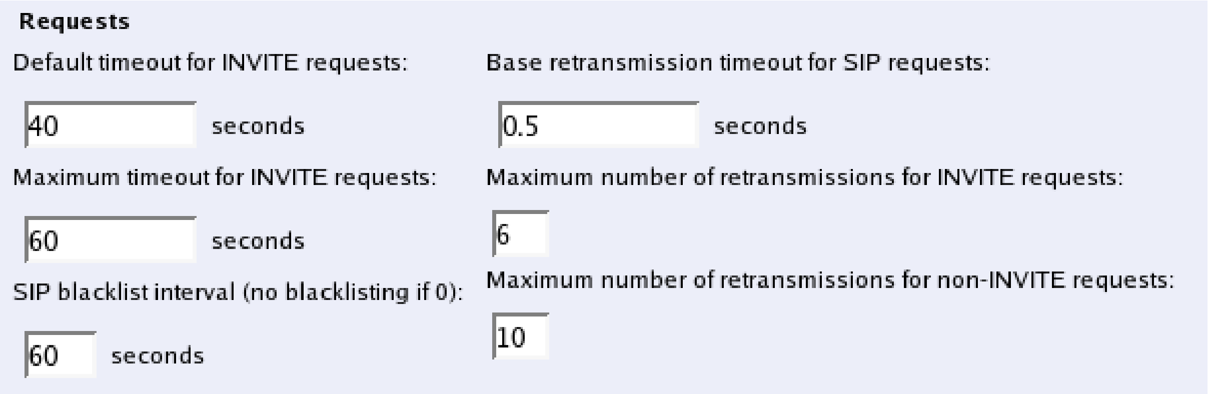
Allowed number of concurrent sessions

Enter the number of concurrent SIP sessions which the Telecommuting Module should handle.

Leave the field empty to allow as many sessions as there are SIP traversal licenses on the Telecommuting Module (number displayed inside parantheses). You can purchase additional SIP traversal licenses from your retailer.

Requests

You can configure timeouts for the different functions of the Telecommuting Module SIP module here. It is not recommended to change from the default values unless you really know what you're doing.



Requests

Default timeout for INVITE requests: 40 seconds

Maximum timeout for INVITE requests: 60 seconds

SIP blacklist interval (no blacklisting if 0): 60 seconds

Base retransmission timeout for SIP requests: 0.5 seconds

Maximum number of retransmissions for INVITE requests: 6

Maximum number of retransmissions for non-INVITE requests: 10

Default timeout for INVITE requests

When sending an INVITE request you can specify a timeout, telling how long you can wait before getting an answer.

If no timeout is given when an INVITE request is sent, the Telecommuting Module sends the default timeout entered here.

Maximum timeout for INVITE requests

Here, enter the maximum timeout to allow for an INVITE request. If a higher timeout is given, the Telecommuting Module changes it to the value entered here.

SIP blacklist interval

When the Telecommuting Module sends out a SIP request and no reply is received, the SIP peer (say, a SIP server or an IP phone) will be blacklisten for the given time interval. This blacklisting means that no new SIP requests will be sent to the unit, even if requests that should be routed to this unit is received by the Telecommuting Module.

If the SIP request which caused the blacklisting, or a subsequent SIP request for that unit, can be routed to another device instead, the Telecommuting Module will keep on sending those requests to the next known IP address for the domain/user in question. When the blacklist ends, the Telecommuting Module will go back to sending requests to the previously blacklisted unit again.

If a 0 is entered into this field, the SIP blacklisting will not be used by the Telecommuting Module.

Base retransmission timeout for SIP requests

When the Telecommuting Module sends out a SIP request, it will expect a reply within a certain time. If no reply has been received within the **Base retransmission timeout**, the Telecommuting Module will start resending the request.

Maximum number of retransmissions for INVITE requests

When the Telecommuting Module sends out an INVITE request, it will wait for a reply until the **Base retransmission timeout** and then start to retransmit the request. The time intervals between retransmissions will double for each new retransmission.

Example: If the **Base retransmission timeout** is 0.5 seconds and the **Maximum number of retransmissions** is 6, the INVITE requests will be sent with intervals of 0.5 s, 1 s, 2 s, 4 s, 8 s, and 16 s.

Maximum number of retransmissions for non-INVITE requests

When the Telecommuting Module sends out a request which is not an INVITE request, it will wait for a reply until the **Base retransmission timeout** and then start to retransmit the request. The time intervals between retransmissions will double for each new retransmission until the interval reaches 4 seconds. After that, retransmissions will be made with a 4-second interval.

Example: If the **Base retransmission timeout** is 0.5 seconds and the **Maximum number of retransmissions** is7, the requests will be sent with intervals of 0.5 s, 1 s, 2 s, 4 s, 4 s, 4 s, and 4 s.

Save

Saves the Sessions and Media configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Remote SIP Connectivity

If you are at a hotel or somewhere else where you find yourself behind a NAT-ing device that does not understand SIP, you will have use of the SIP Remote Connectivity of 3Com VCX IP Telecommuting Module. This will help your client to traverse the NAT, even if the device doing the NAT does not understand SIP. The SIP Remote Connectivity is only available if you have installed the Remote Connectivity module.

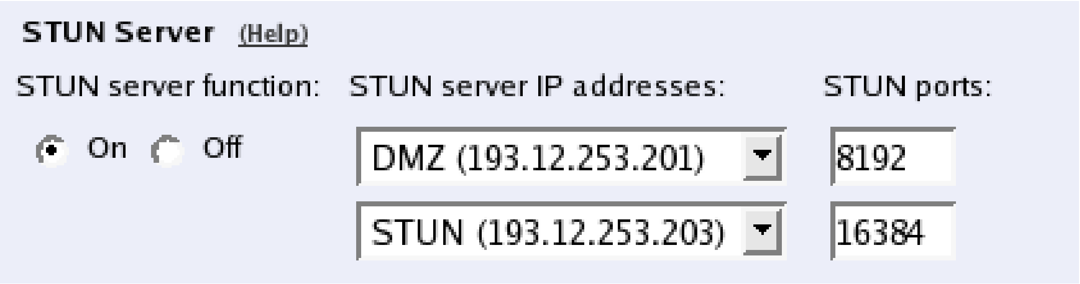
If you have a STUN-capable SIP client, you need just turn on the STUN server of the Telecommuting Module to make the client work behind NAT. If you have a SIP client that does not do STUN (or if the STUN-capable client is located behind a Symmetric NAT device), you have to use the Remote NAT Traversal feature. This is easier for the client, but generates more network traffic for the Telecommuting Module.

STUN Server

Use the STUN server if you have STUN-aware SIP clients. You will need at least two public IP addresses to make it work with all client implementations of STUN.

STUN will not work properly if the NAT device uses Symmetric NAT (where the client’s private IP/port pair translates to different public IP/port pairs depending on destination, and where other computers than the destination host are not allowed to reply on that IP/port pair).

The client also needs extra configuring for this; it must know which IP addresses and ports the STUN server has.



STUN Server (Help)

STUN server function: ● On ○ Off

STUN server IP addresses: DMZ (193.12.253.201) / STUN (193.12.253.203)

STUN ports: 8192 / 16384

STUN server function

Select if the STUN server function should be switched **On** or **Off**.

STUN server IP addresses

When activated, the STUN server requires two IP addresses, and a pair of ports on these two IP addresses, on the Telecommuting Module. STUN clients will then send test packets to these ports.

Select two IP addresses out of the ones assigned to the Telecommuting Module under **Directly Connected Networks** and **Alias** on the interface pages.

Note: for the STUN server to work properly, you need to select IP addresses which the clients can reach. In normal circumstances, this means that only public IP addresses can be used.

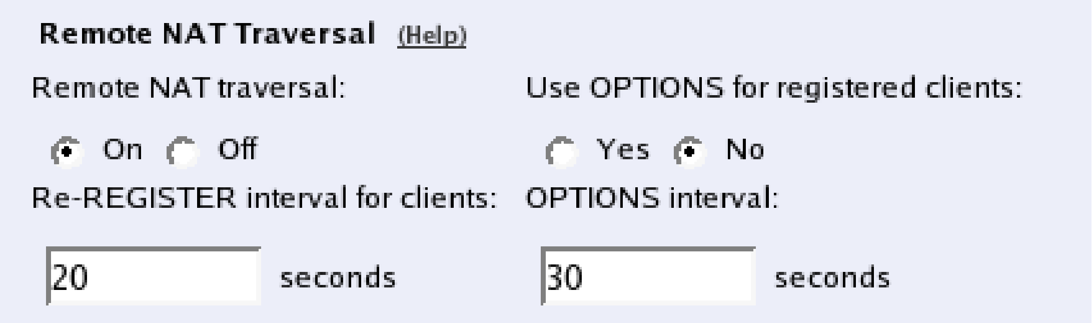
STUN ports

Enter the ports to use for the STUN server. These ports, on the IP addresses selected, will not be available for anything else.

Remote NAT Traversal

If your SIP client is not STUN-capable, you can use the built-in Remote NAT traversal feature of the Telecommuting Module. The client must register on the Telecommuting Module (or through it).

The SIP client needs to re-REGISTER rather often for this to work. The exact period for this depends on the NAT-ing device, but 20 seconds should be enough to get across most NAT boxes. It is not advisable to use OPTIONS for 3Com SIP clients.



Remote NAT Traversal (Help)

Remote NAT traversal: ● On ○ Off

Use OPTIONS for registered clients: ○ Yes ● No

Re-REGISTER interval for clients: 20 seconds

OPTIONS interval: 30 seconds

Remote NAT traversal

Turn this function on or off.

Re-REGISTER period for clients

Clients using this function will have to re-REGISTER very often, to keep the IP/port NAT binding. A re-REGISTER interval of 20 seconds should be enough to ensure this.

If some clients are unable to handle short re-REGISTER intervals, the Telecommuting Module can send OPTIONS messages instead, see below.

Use OPTIONS for registered clients

Select if the Telecommuting Module should use OPTIONS packets instead of short re-REGISTER intervals to keep the NAT binding.

OPTIONS should not be used for 3Com phones, as they don’t respond to that.

OPTIONS interval

Enter the interval for the Telecommuting Module to send OPTIONS packets to the client.

Save

Saves the Remote SIP Connectivity configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Chapter 9. SIP Traffic

SIP (Session Initiation Protocol) is a protocol for creating and terminating various media stream sessions over an IP network. It is for example used for Internet telephone calls and distribution of video streams.

SIP takes care of the initiation, modification and termination of a session with one or more participants. The protocol makes it possible for the participants to agree on what media types they should share. You can find more information about SIP in appendix A, More About SIP, and in RFC 3261.

You find examples on how to configure your 3Com VCX IP Telecommuting Module for SIP in chapter 4, How To Configure SIP.

The SIP module in 3Com VCX IP Telecommuting Module handles SIP requests for users who have registered on a machine connected to the Telecommuting Module. The module forwards the request through the Telecommuting Module, which enables users behind different network interfaces to make contact. The SIP module controls the security rules to temporarily let through the media streams that the users agree on, on their assigned ports.

You must enter a **DNS server** and a **Default gateway** on the **Basic Configuration** page to make the SIP module work satisfactorily.

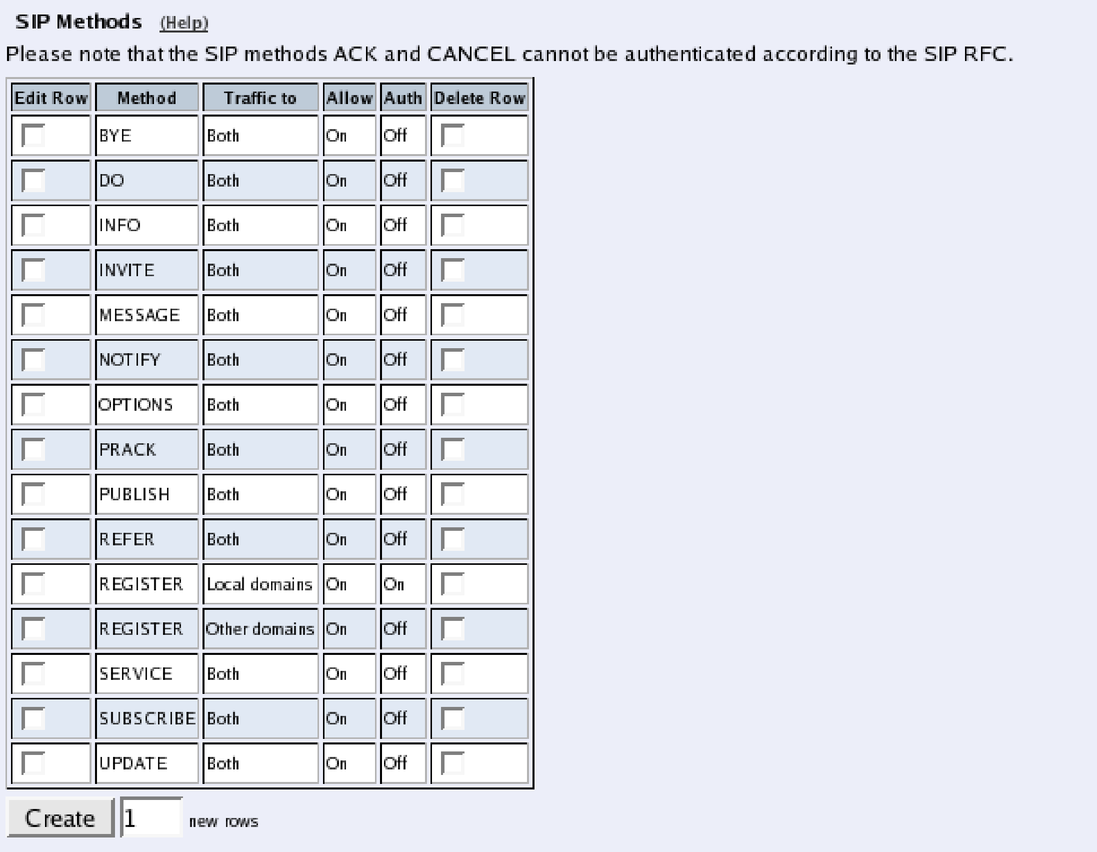
These SIP functions are configured in the **SIP Traffic** section:

- Allowed SIP methods
- Routing of incoming SIP requests

SIP Methods

Enter the SIP methods you want to allow and/or authenticate. Methods that are not listed here will be blocked by the Telecommuting Module.

Common methods are predefined (from RFC 3261). Note that the standard methods **ACK** and **CANCEL** can't be authenticated.



SIP Methods (Help)

Please note that the SIP methods ACK and CANCEL cannot be authenticated according to the SIP RFC.

Edit Row	Method	Traffic to	Allow	Auth	Delete Row
□	BYE	Both	On	Off	□
□	DO	Both	On	Off	□
□	INFO	Both	On	Off	□
□	INVITE	Both	On	Off	□
□	MESSAGE	Both	On	Off	□
□	NOTIFY	Both	On	Off	□
□	OPTIONS	Both	On	Off	□
□	PRACK	Both	On	Off	□
□	PUBLISH	Both	On	Off	□
□	REFER	Both	On	Off	□
□	REGISTER	Local domains	On	On	□
□	REGISTER	Other domains	On	Off	□
□	SERVICE	Both	On	Off	□
□	SUBSCRIBE	Both	On	Off	□
□	UPDATE	Both	On	Off	□

Method

Enter the name of the SIP method. This should be the name used in RFC 3261.

Traffic to

Here, you select the direction of the traffic. **Local domains** means that traffic to **Local SIP Domains** of this Telecommuting Module is affected by this row. **Other domains** means that traffic to all domains which are not **Local SIP Domains** of this Telecommuting Module is affected by this row. **Both** means that this row affects all traffic for the method, regardless of where the traffic is bound.

Allow

Select if the method in this direction should be allowed or not. For methods that are not allowed, the Telecommuting Module sends a 403 (Forbidden) response.

Auth

In the base Telecommuting Module, authentication will not be performed, and this setting will have no effect.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves the SIP Methods configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and reset changes in old rows.

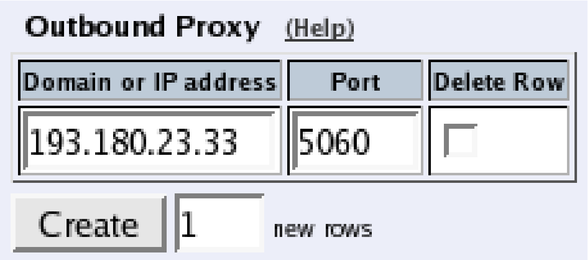
Routing

Here, you configure routing of the SIP signaling received by the Telecommuting Module The options are: to forward all SIP requests to a server, regardless of what they concern (**Outbound Proxy**), and to forward all requests addressed to a specific SIP domain to a SIP server (**DNS Override For SIP Requests**).

You can also select to process class 3xx messages in the Telecommuting Module or pass them on to the client.

Outbound Proxy

Here, you can enter an external SIP proxy to which all SIP requests should be sent. This could be useful e.g. if the Telecommuting Module separates two local departments of a company, and all SIP requests should be processed by the main firewall connected to the Internet.



Domain or IP address	Port	Delete Row
193.180.23.33	5060	□

Domain or IP address

Enter the domain name or IP address of the external SIP proxy.

Port

Enter the port number of the external SIP proxy.

If no port number is entered, the Telecommuting Module will make a DNS query for an SRV record. If a port number is entered, it will query for an A record.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

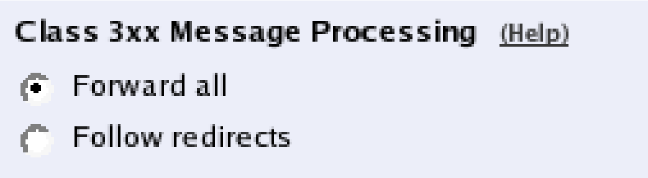
Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Class 3xx message processing

Sometimes during negotiation for a connection, status messages about this process will be sent. Here you select whether to forward these to the client or process them in the Telecommuting Module.

A class 3xx message from a server means that the connection attempt was terminated, but no connection was established, e.g. due to use of the wrong address or service. The Telecommuting Module as well as some clients can use this information to make new attempts which might have a better chance to succeed.



Class 3xx Message Processing (Help)

● Forward all

○ Follow redirects

Forward class 3xx messages

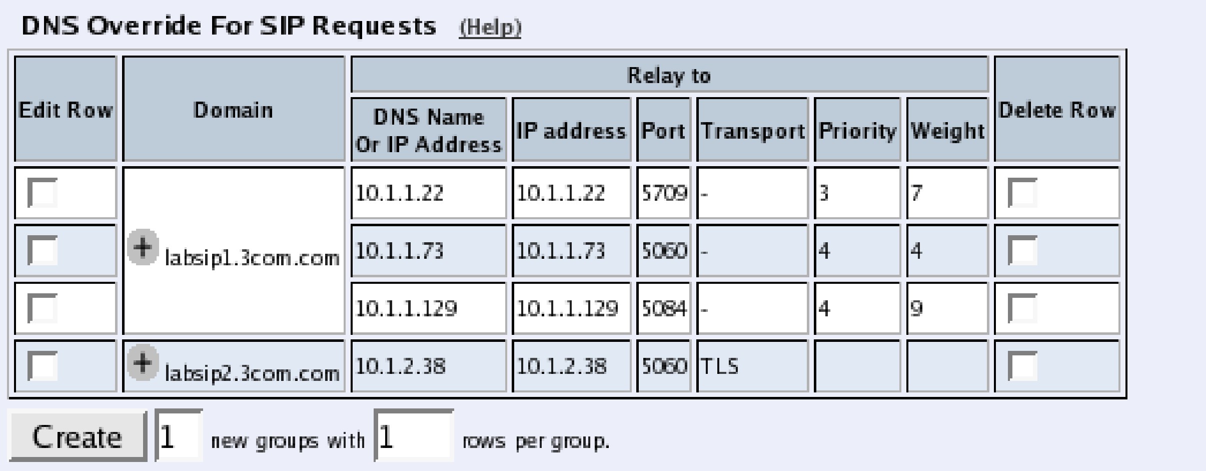
The choices are **Forward all**, which forwards all class 3xx messages to the client (which might be able to use this information), and **Follow redirects**, which means that the Telecommuting Module itself uses the information and might make new connection attempts. In this case, it will only inform the client when the connection finally is established or the attempt has failed totally.

DNS Override For SIP Requests

Here, you can register SIP domains to which the Telecommuting Module should be able to forward requests, but which for some reason cannot be resolved in DNS. Enter an IP address and port to which the requests should be forwarded. You can also select to use a specific protocol.

If you use a dialing domain that looks like an IP address, you must enter that dialing domain here along with the SIP server for that domain.

You can enter more than one IP address or host name for a domain, and set weights and priorities for these.



DNS Override For SIP Requests (Help)

Edit Row	Domain	Relay to						Delete Row
		DNS Name Or IP Address	IP address	Port	Transport	Priority	Weight	
□	⊕ labsip1.3com.com	10.1.1.22	10.1.1.22	5709	-	3	7	□
□		10.1.1.73	10.1.1.73	5060	-	4	4	□
□		10.1.1.129	10.1.1.129	5084	-	4	9	□
□	⊕ labsip2.3com.com	10.1.2.38	10.1.2.38	5060	TLS			□

Create 1 new groups with 1 rows per group.

Domain

Enter the domain name of the SIP domain.

Relay to

Enter the IP address for the SIP registrar handling the domain. You can also enter a DNS name for the SIP registrar, if it has a DNS-resolvable host name, even if the SIP domain is not possible to look up in DNS.

Under **Port**, enter the port on which the SIP registrar listens for SIP traffic. The standard port is 5060 (5061 for TLS).

You can select which transport protocol to use between the Telecommuting Module and the registrar. Under **Transport**, select from UDP, TCP and TLS. You can also select "-", which means that the signaling is passed on using the same transport as was used to reach the Telecommuting Module.

If you entered more than one IP address/host name for the same domain, you should also assign them **Priority** and **Weight**. A low **Priority** value means that the unit should have a high priority. If more than one unit has the same **Priority**, the signaling sent to them is distributed between them according to their **Weight**. If two units have the same priority, and Unit 1 has weight 4, and Unit 2 has weight 9, 4/13 of the signaling will be sent to Unit 1, and 9/13 will be sent to Unit 2.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new groups and rows you want to add to the table, and then click on **Create**.

Save

Saves the Routing configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Look up all IP addresses again

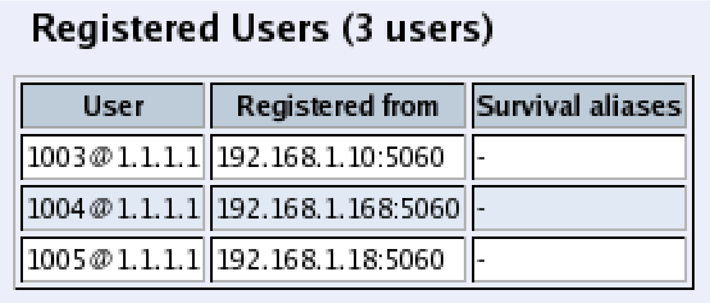
Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

Session Status

You can monitor the current SIP activity. The tables are updated when you select the page or reload it.

Registered Users

Here the currently registered users are listed.



Registered Users (3 users)

User	Registered from	Survival aliases
1003@1.1.1.1	192.168.1.10:5060	-
1004@1.1.1.1	192.168.1.168:5060	-
1005@1.1.1.1	192.168.1.18:5060	-

User

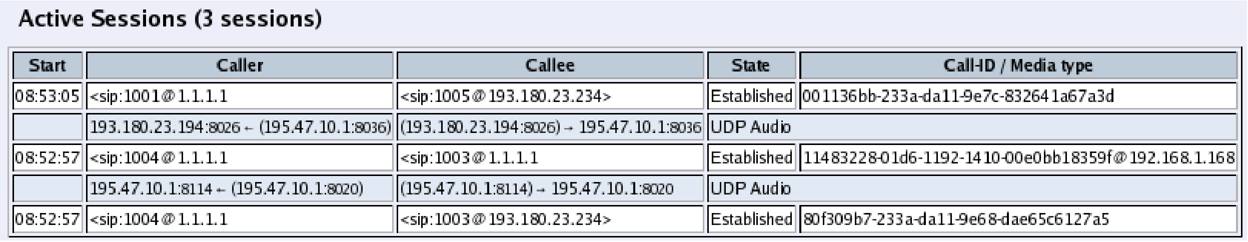
The SIP address of the registered user. The address looks like *name@domain*, where *name* is a user name or a telephone number, and *domain* is a domain name or an IP address.

Registered from

The IP address of the computer from which the user registered.

Active Sessions

Here the currently active sessions are listed.



Active Sessions (3 sessions)

Start	Caller	Callee	State	Call-ID / Media type
08:53:05	<sip:1001@1.1.1.1	<sip:1005@193.180.23.234>	Established	001136bb-233a-da11-9e7c-832641a67a3d
	193.180.23.194:8026 ← (195.47.10.1:8036)	(193.180.23.194:8026) → 195.47.10.1:8036	UDP Audio	
08:52:57	<sip:1004@1.1.1.1	<sip:1003@1.1.1.1	Established	11483228-01d6-1192-1410-00e0bb18359f@192.168.1.168
	195.47.10.1:8114 ← (195.47.10.1:8020)	(195.47.10.1:8114) → 195.47.10.1:8020	UDP Audio	
08:52:57	<sip:1004@1.1.1.1	<sip:1003@193.180.23.234>	Established	80f309b7-233a-da11-9e68-dae65c6127a5

Start

The time when the call started.

Caller

The SIP and IP addresses of the calling user.

Callee

The SIP and IP addresses of the called user.

State

Shows if the call is established or under negotiation.

Call ID/Media Type

Each SIP session has a unique ID, which is shown here. You can also see what media type is used in the call.

Chapter 10. Administration

Under Administration, you

- apply your configuration
- define administrator users and change their passwords
- save the preliminary configuration to file
- load a saved configuration
- view the configuration
- reboot your 3Com VCX IP Telecommuting Module
- restart the SIP module on your 3Com VCX IP Telecommuting Module
- upgrade your 3Com VCX IP Telecommuting Module
- set table formats
- set date, time, and time zone (manually or via NTP)

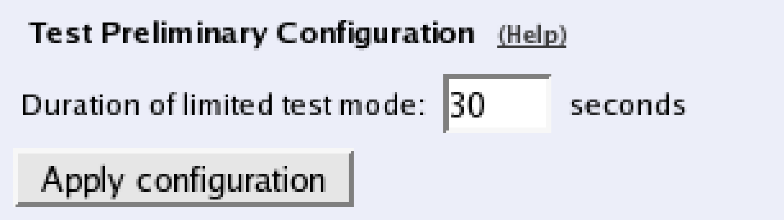
Save/Load Configuration

Here, you work with the preliminary and permanent configurations, save them and load new configurations from previously saved configurations.

Test Preliminary Configuration

When **Apply configuration** is pressed, the Telecommuting Module will test the configuration before you make it permanent.

During test, the Telecommuting Module waits for you to press one of the three buttons displayed. If you never see the three buttons, something in your preliminary configuration (now tested) is wrong, which makes it impossible for you to access the configuration web interface.



Test Preliminary Configuration (Help)

Duration of limited test mode: 30 seconds

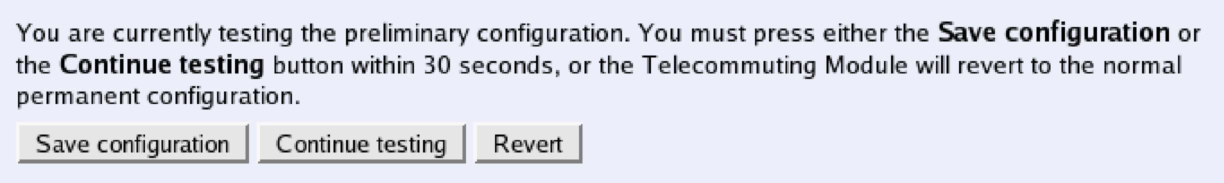
Duration of limited test mode

Here, you enter the time limit for the testing. If you do not press any button within this time, the Telecommuting Module will assume that some part of your preliminary configuration makes connecting impossible. When the timeout is reached, the Telecommuting Module automatically reverts to the old permanent configuration. If this occurs, you will be informed when trying to press a button.

Apply configuration

Saves the preliminary configuration to the permanent configuration and puts it into use. You can test your preliminary configuration before finalizing it.

Three buttons are displayed during the test:



You are currently testing the preliminary configuration. You must press either the **Save configuration** or the **Continue testing** button within 30 seconds, or the Telecommuting Module will revert to the normal permanent configuration.

Save configuration saves your preliminary configuration to the permanent configuration and puts it into use.

Continue testing shows a new page with only the other two buttons.

Revert cancels this test of the preliminary configuration without saving.

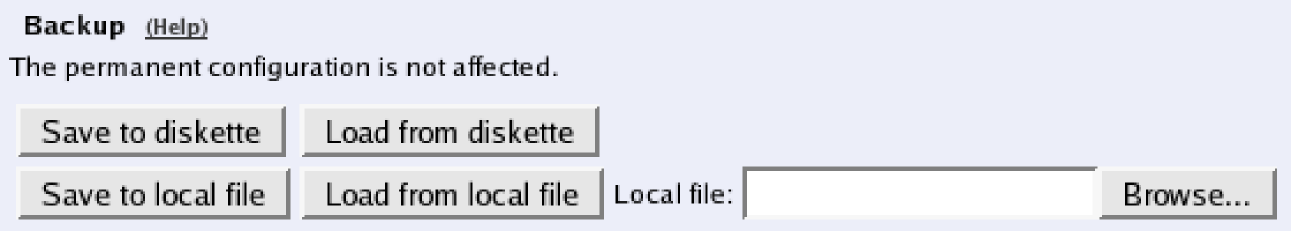
If you do not press any button within the time limit, the Telecommuting Module will revert to the old permanent configuration, just as if you had pressed **Revert**. This is useful if you happen to configure your Telecommuting Module so it isn't accessible from your browser.

After the timeout, pressing either of the three buttons will show a new page which will inform you that the test run was aborted.

Restarting the Telecommuting Module by cycling the power also cancels the test.

Backup

All configurations can be saved to and loaded from diskette or file. This does not affect the permanent configuration.



Backup (Help)

The permanent configuration is not affected.

Save to diskette

Insert a formatted diskette into the Telecommuting Module's floppy drive and press **Save to diskette** to save the preliminary configuration. Do not remove the diskette until the light on the floppy drive goes out.

Check that you get a confirmation of the saving. If not, the diskette may be faulty.

Load from diskette

Insert the diskette with the saved configuration into the Telecommuting Module's floppy drive and press **Load from diskette**. Do not remove the diskette until the light on the floppy drive goes out. The contents of the diskette are now loaded in the preliminary configuration.

Save to local file

Press **Save to local file** to save the preliminary configuration to the file you have selected. A new window is opened where you enter the name of the file.

Load from local file

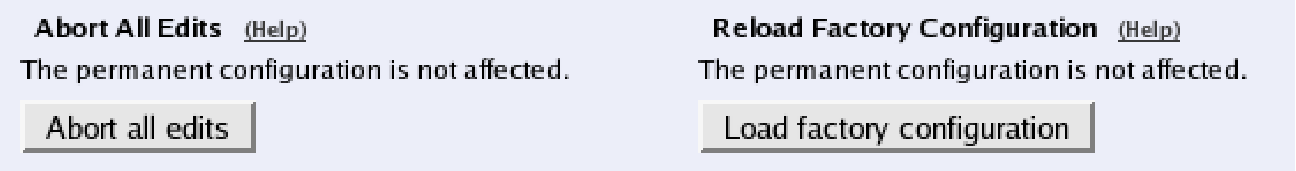
Press **Load from local file** to load a new preliminary configuration from the file you have selected.

Browse

Browse is used to scan your local disk. The web browser opens a new window where you can search among files and directories. Go to the right directory and select the file you want to upload.

Revert to old configurations

You can revert to old configurations of the Telecommuting Module, either back to the last configuration successfully applied, or to the configuration delivered with your Telecommuting Module from the factory.



Abort All Edits (Help)

The permanent configuration is not affected.

Reload Factory Configuration (Help)

The permanent configuration is not affected.

Abort All Edits

Abort all edits copies the permanent configuration to the preliminary configuration. All changes made in the preliminary configuration are deleted.

Reload Factory Configuration

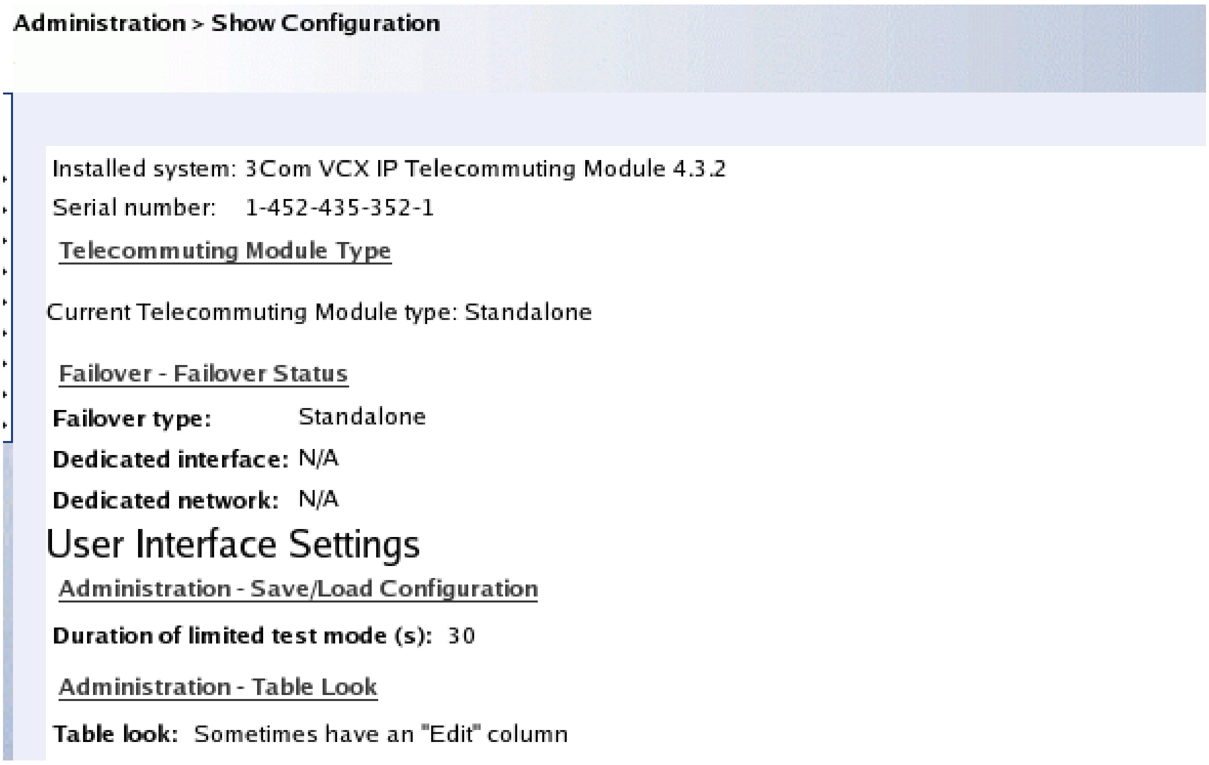
The factory configuration is the standard configuration that is delivered with a Telecommuting Module. Click on this button to load this configuration into the preliminary configuration. The permanent configuration is not affected.

Show configuration

Shows both the preliminary and permanent configurations, in that order. Before the preliminary configuration, you see the Telecommuting Module’s version, serial number, the time zone and table format you selected.

The heading before each table for the preliminary configuration is clickable and accesses the corresponding configuration page.

Print this list from your web browser and store it in a safe place.



Administration > Show Configuration

Installed system: 3Com VCX IP Telecommuting Module 4.3.2

Serial number: 1-452-435-352-1

Telecommuting Module Type

Current Telecommuting Module type: Standalone

Failover - Failover Status

Failover type: Standalone

Dedicated interface: N/A

Dedicated network: N/A

User Interface Settings

Administration - Save/Load Configuration

Duration of limited test mode (s): 30

Administration - Table Look

Table look: Sometimes have an "Edit" column

User Administration

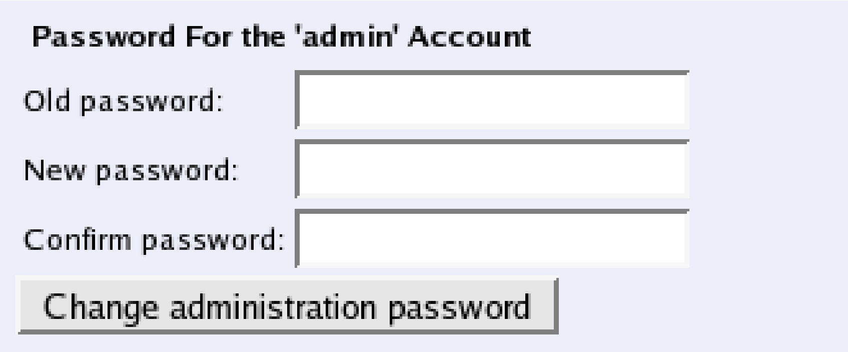
On the **User Administration** page, you change the administration password for the *admin* account on your Telecommuting Module and create other administrator user accounts. The characters in the password are displayed as little stars. Remember that the password is sent unencrypted over the network if you use HTTP instead of HTTPS.

You can authenticate administrators using a RADIUS server instead of a local password (select this on the **Access Control** page under **Basic Configuration**). When RADIUS is used, you must also enter a RADIUS server on the **RADIUS** page under **Basic Configuration**.

More information about how to configure the RADIUS server to authenticate administrators can be found in the RADIUS section.

Password For the ’admin’ Account

The *admin* user is predefined. That user can make changes, load configurations, apply configurations and log on the Telecommuting Module via the serial cable. You can’t remove this user or change its privileges, only change its password.



Password For the 'admin' Account

Old password:

New password:

Confirm password:

Old password

Enter the old password for the *admin* user.

New password, Confirm password

Enter the new password in both fields. You must enter the exact same password in both fields, to make sure that you did not make a mistake.

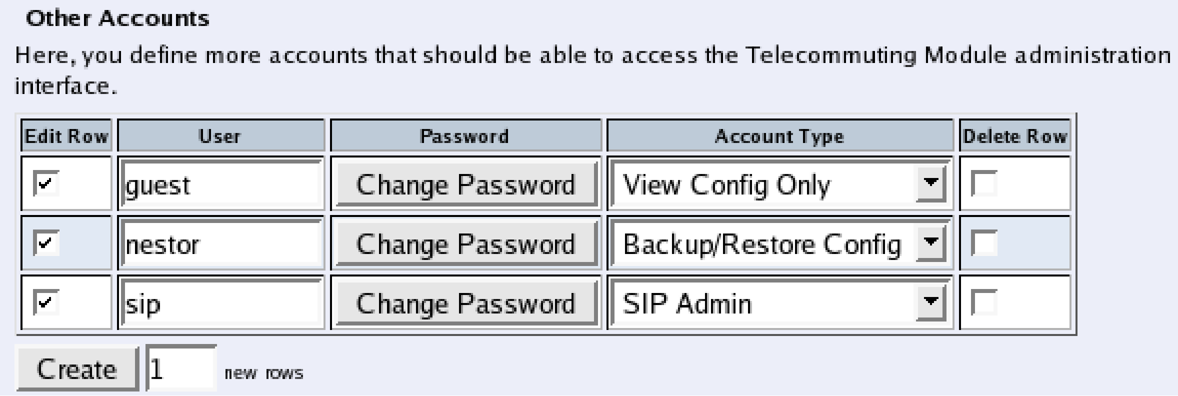
Change administration password

Click this button to change the password for the *admin* user. The new password is now saved on the Telecommuting Module.

Other Accounts

Here, you define other user accounts that can access the Telecommuting Module. A user account can be restricted to only look at settings, or to change only some settings. Changes of configuration are logged by user name.

Changes in restrictions for an existing user account are immediate. The exception is changes for a currently logged on user, for which the changes will have effect the next time he/she logs on.



Other Accounts

Here, you define more accounts that should be able to access the Telecommuting Module administration interface.

Edit Row	User	Password	Account Type	Delete Row
☑	guest	Change Password	View Config Only	☐
☑	nestor	Change Password	Backup/Restore Config	☐
☑	sip	Change Password	SIP Admin	☐

1 new rows

User

Enter the user name for this account. The name is used when the user logs on and for logging the changes.

Password

Press the **Change password** button to enter the password for this user.

Account Type

Select what privileges this user should have.

Full Access means that the user can make any changes to the configuration. This is the same privileges as the *admin* user has in the web GUI, but only the *admin* user can log on via the serial cable.

Backup/Restore Config means that the user can download the configuration to file, and upload a configuration file to the Telecommuting Module. The user is also allowed to apply configurations.

The **VPN admin** account is not used in a base Telecommuting Module.

The **VPN renegotiator** account is not used in a base Telecommuting Module.

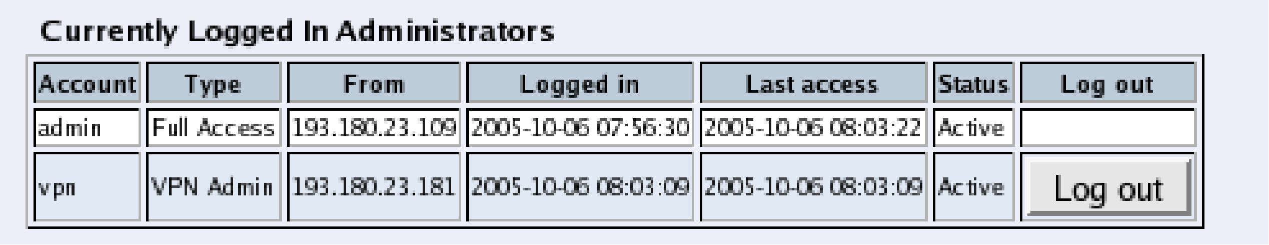
SIP admin means that the user can make any changes on the **SIP Services** and **SIP Traffic** pages and apply configurations, but can’t change any other configuration.

View Config Only means that the user can view any configuration and make log searches, but can’t change any configuration.

Off means that the user is not allowed to log on to the web interface of the Telecommuting Module.

Currently Logged In Administrators

Here, all users logged on the Telecommuting Module web interface are shown. If your user has full access, you can log out other users here.



Currently Logged In Administrators

Account	Type	From	Logged in	Last access	Status	Log out
admin	Full Access	193.180.23.109	2005-10-06 07:56:30	2005-10-06 08:03:22	Active	
vpn	VPN Admin	193.180.23.181	2005-10-06 08:03:09	2005-10-06 08:03:09	Active	Log out

Account

The name of the logged on user.

Type

Here, the account type for the user is shown. The account type tells you the user’s access rights for the Telecommuting Module web interface.

From

Here you see from which IP address the user connected to the Telecommuting Module.

Logged in

Here you see when the user logged on to the Telecommuting Module.

Last access

Here you see when the user last accessed the Telecommuting Module web interface. Accesses could be a change of a parameter, a change of web page or a log search.

Status

Here you see if the user is active or idle. The Telecommuting Module marks a user as idle if the user has not accessed the web interface in ten minutes.

Log out

If your user has full access to the web interface, you can log out other users. However, if you do not change their password (or change the Account type to Off), they can just log on again.

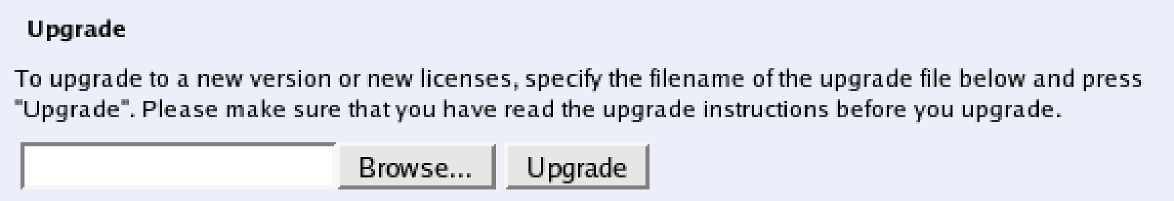
Upgrade

Read these instructions carefully before upgrading. You find version upgrades for 3Com VCX IP Telecommuting Module at http://eSupport.3com.com/. The upgrade is signed with GNU Privacy Guard. When 3Com VCX IP Telecommuting Module is upgraded, it automatically checks the signing before accepting the upgrade.

You should always upgrade your Telecommuting Module to the latest version.

Here, you also upgrade with extension modules (e.g. QoS) and SIP licenses. Upgrading with modules and licenses is exactly the same procedure as upgrading to a new version.

You save the upgrade to a file on your workstation or network file system. When upgrading, select **Upgrade**.



Upgrade

To upgrade to a new version or new licenses, specify the filename of the upgrade file below and press "Upgrade". Please make sure that you have read the upgrade instructions before you upgrade.

Upgrade

This is the procedure to follow when upgrading an 3Com VCX IP Telecommuting Module.

Step 1

First save the upgrade to a file on your workstation. Enter the file name and path in the box or press **Browse** to search the disk. When you have selected a file, press **Upgrade from network**. The Telecommuting Module will read the upgrade file and check that it was correctly signed and is compatible with the current Telecommuting Module version.

Step 2

If the upgrade file is correct, a text will appear at the top of the web page, informing about what version the upgrade is. Two new buttons will also be shown; **Apply upgrade** and **Remove upgrade**. You can still load new upgrades replacing the old one, which is useful if you for example have selected an upgrade which is too old.

Apply upgrade

Pressing **Apply upgrade** will make the Telecommuting Module install the new upgrade.

Remove upgrade

Remove upgrade removes the loaded upgrade from the Telecommuting Module. The upgrade will not be installed.

Step 3

If **Apply upgrade** was pressed, the buttons **Try the upgrade** and **Remove upgrade** will appear.

Try the upgrade

Try the upgrade will reboot the Telecommuting Module and test the loaded upgrade. When the reboot is done, log on to continue upgrading the Telecommuting Module.

Remove upgrade

Remove upgrade removes the loaded upgrade from the Telecommuting Module. The upgrade will not be installed.

Step 4

When you have pressed **Try the upgrade** and the Telecommuting Module has rebooted, you will see two buttons on top of every web page: **Accept upgrade** and **Abort upgrade**.

Now, you can choose to make the upgrade permanent or to revert to the old version. You can check the configuration, but no changes can be done before the upgrade is permanent. If the Telecommuting Module is rebooted before the upgrade is made permanent, it will revert to the old version.

Accept upgrade

Accept upgrade will complete the upgrade. When you have accepted the upgrade, you must also go to **Save/Load Configuration** and **Apply configuration**, i. e. the new upgrade.

Abort upgrade

Abort upgrade aborts the upgrade. The Telecommuting Module will revert to the old version.

Downgrade

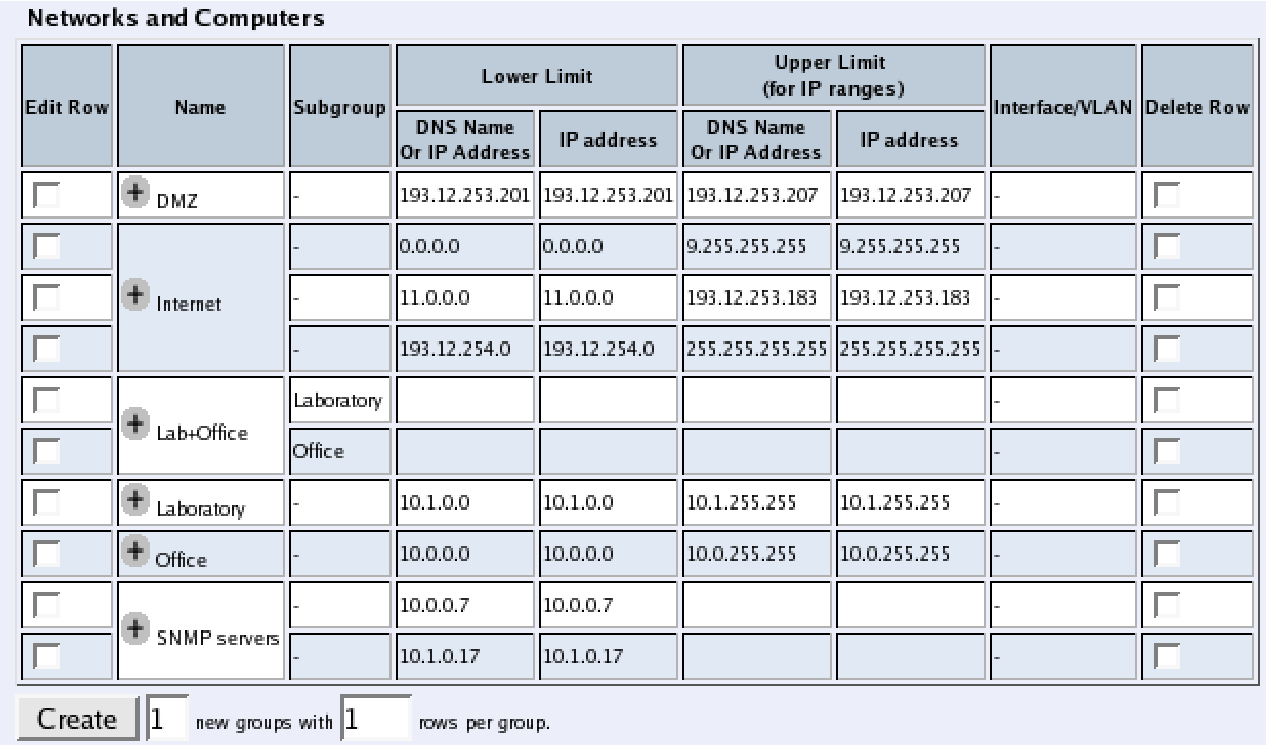
If the Telecommuting Module has been upgraded before, it is possible to downgrade to the previous version.

When you downgrade, the Telecommuting Module will revert to the configuration it had before upgrading. All configuration changes made after the upgrade will be lost.

When you want to upgrade, the upgrade file must be uploaded again.

Table Look

There are two alternatives for tables in 3Com VCX IP Telecommuting Module: Either you can change the contents of the table directly, or else you must click on a box in the **Edit row** column to allow the row to be changed. The image below shows how tables with an **Edit row** column can look.



Networks and Computers

Edit Row	Name	Subgroup	Lower Limit		Upper Limit (for IP ranges)		Interface/VLAN	Delete Row
			DNS Name Or IP Address	IP address	DNS Name Or IP Address	IP address		
□	+ DMZ	-	193.12.253.201	193.12.253.201	193.12.253.207	193.12.253.207	-	□
□	+ Internet	-	0.0.0.0	0.0.0.0	9.255.255.255	9.255.255.255	-	□
□		-	11.0.0.0	11.0.0.0	193.12.253.183	193.12.253.183	-	□
□		-	193.12.254.0	193.12.254.0	255.255.255.255	255.255.255.255	-	□
□	+ Lab+Office	Laboratory					-	□
□		Office					-	□
□	+ Laboratory	-	10.1.0.0	10.1.0.0	10.1.255.255	10.1.255.255	-	□
□	+ Office	-	10.0.0.0	10.0.0.0	10.0.255.255	10.0.255.255	-	□
□	+ SNMP servers	-	10.0.0.7	10.0.0.7			-	□
□		-	10.1.0.17	10.1.0.17			-	□

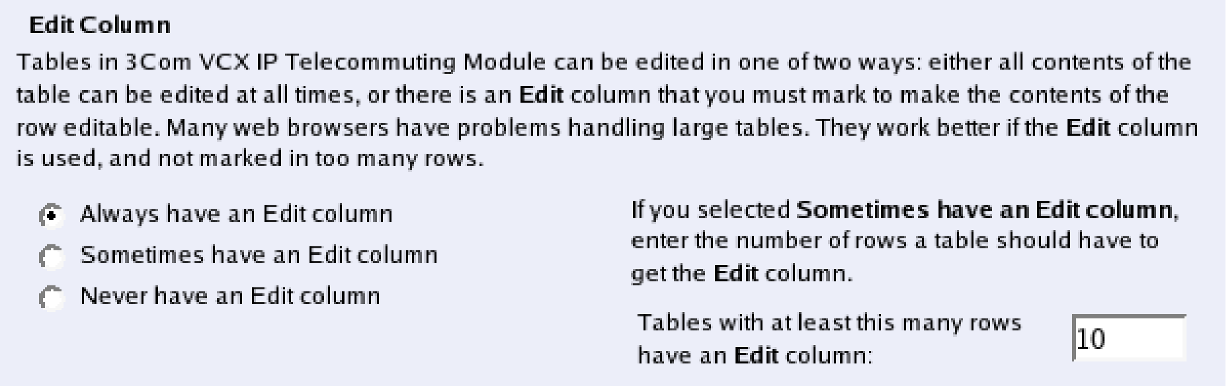
Create [1] new groups with [1] rows per group.

To change a row, click in the **Edit** box for that row and click on **Save** or **Add new rows**. The page is updated so that you can change the configurations on the row. You can select several rows to change.

With an Edit column, tables with many rows are loaded faster, provided that only few of the Edit boxes are checked.

Edit Column

Select if all, some or none of the Telecommuting Module tables should have an Edit column. If you select that some tables have an Edit column, you also enter the size required to add the Edit column.



Edit Column

Tables in 3Com VCX IP Telecommuting Module can be edited in one of two ways: either all contents of the table can be edited at all times, or there is an **Edit** column that you must mark to make the contents of the row editable. Many web browsers have problems handling large tables. They work better if the **Edit** column is used, and not marked in too many rows.

● Always have an Edit column

○ Sometimes have an Edit column

○ Never have an Edit column

If you selected **Sometimes have an Edit column**, enter the number of rows a table should have to get the **Edit** column.

Tables with at least this many rows have an **Edit** column: 10

Always have an Edit column

Regardless of the table size, all tables will have an Edit column.

Sometimes have an Edit column

Only the tables of the size entered below will have an Edit column.

Never have an Edit column

Regardless of the table size, no table will have an Edit column.

Tables with at least this many rows have an Edit column

This is an additional setting which only takes effect if you selected **Sometimes have an Edit column** above. Tables with at least the number of rows as you enter in the box will have an **Edit** column. Tables with less rows than this are changeable directly.

The standard setting for new 3Com VCX IP Telecommuting Modules is Tables with at least **10** rows have an Edit column.

It is not advisable to enter a value higher than 15 here, or the web browser won’t be able to satisfactorily manage the tables.

Save

Saves the Table Look configuration to the preliminary configuration. The change takes effect immediately.

Cancel

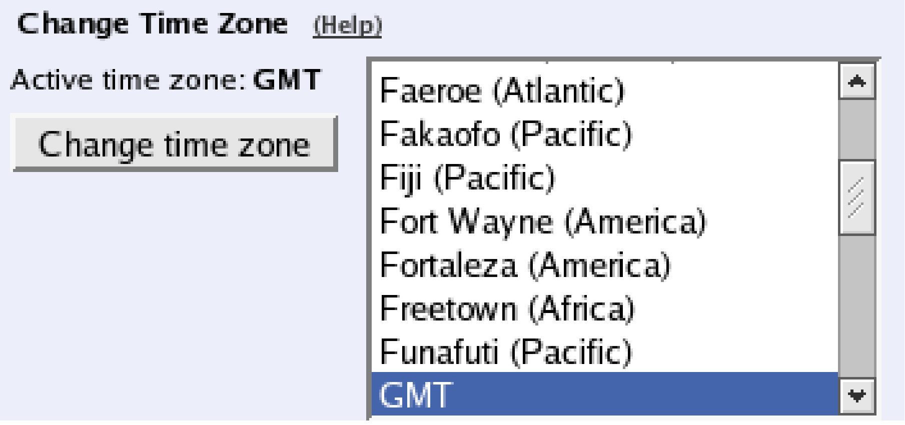
Reverts to the previous table configuration.

Date and Time

Set the Telecommuting Module clock to ensure that the information in the logs has the right date and time. The date and time are displayed at the bottom of all pages. You can set the date and time manually or let the Telecommuting Module get the correct time from an NTP server.

Change Time Zone

Before you change the time in the Telecommuting Module, check that it uses the correct time zone. A change of time zone only affects the time displayed on the Telecommuting Module web pages; the Telecommuting Module clock is not changed.



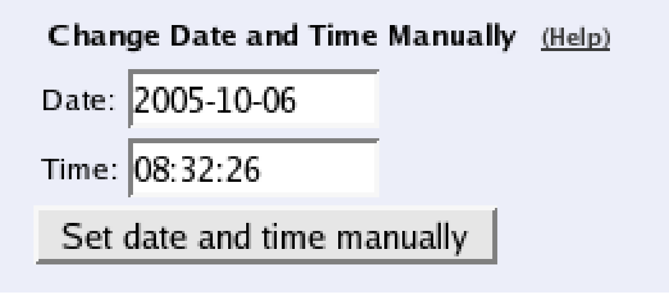
Active time zone: GMT

The **Time zone** field shows the current time zone setting. Change time zone by selecting one in the left-hand box and press the **Change time zone** button.

Change Date and Time Manually

Here you change the Telecommuting Module clock manually. When you change time here, there will be a time gap in the log files (if you change time forwards) or the same time will be shown twice (if you change time backwards).

N.B. Before you change time here, make sure that the Telecommuting Module uses the correct time zone above.



Change Date and Time Manually (Help)
Set date and time manually

Date: 2005-10-06

Time: 08:32:26

Date

The date is written as four digits for the year, two for the month and two for the day. The punctuation between year, month and day must be dashes (-).

Time

Time is written as two digits for the hour, two digits for the minute and two digits for the second, although seconds can be left out. The punctuation between hours, minutes and seconds must be colon (:) or period (.). A 24-hour clock is used.

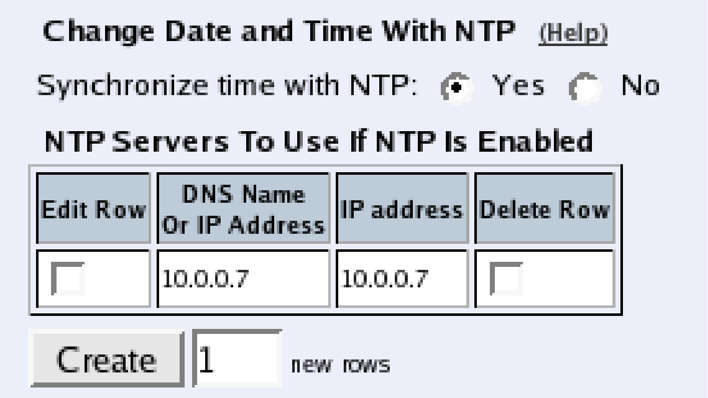
Set date and time manually

Click on **Set date and time manually** to change the clock in the Telecommuting Module to what you entered in the **Date** and **Time** fields.

Change Date and Time With NTP

Instead of setting the time manually, you can let the Telecommuting Module get the correct time from an NTP server. The time for synchronizing will be notably shorter if the Telecommuting Module time is approximately correct when NTP is activated.

N.B. Before you change time here, make sure that the Telecommuting Module uses the correct time zone above.



Change Date and Time With NTP (Help)

Synchronize time with NTP: ● Yes ○ No

NTP Servers To Use If NTP Is Enabled

Edit Row	DNS Name Or IP Address	IP address	Delete Row
□	10.0.0.7	10.0.0.7	□

Synchronize time with NTP

Here, select if NTP synchronizing should be enabled or not.

Enter servers to sync with in the table below.

DNS name or IP address

The name/IP address of the NTP server to which the Telecommuting Module should connect.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows**, **Save**, or **Look up all IP addresses again**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

Saves all Date and Time configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

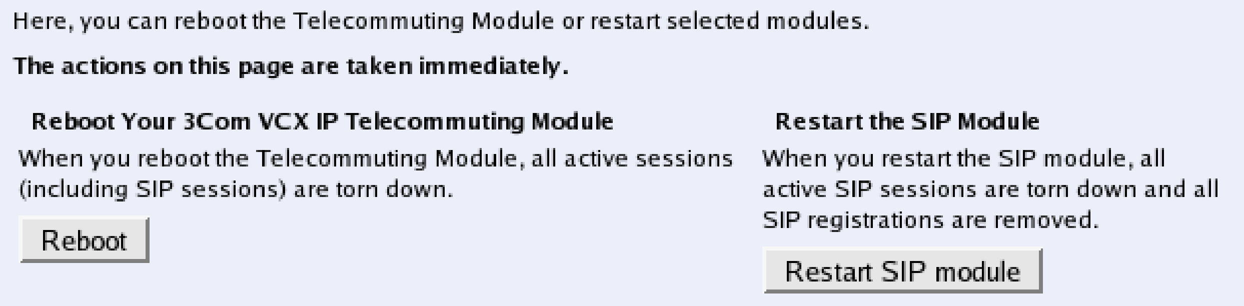
Restart

Here, you can reboot the Telecommuting Module or restart certain modules.

When the Telecommuting Module is rebooted, all active sessions, including SIP sessions (SIP calls, video conferences etc), will be torn down. SIP user registrations are not affected.

When the SIP module is restarted, all active SIP sessions (SIP calls, video conferences etc) will be torn down and all SIP user registrations will be removed.

N.B! The reboot/restart will be instantaneous when the button is pressed.



Here, you can reboot the Telecommuting Module or restart selected modules.

The actions on this page are taken immediately.

Reboot Your 3Com VCX IP Telecommuting Module

When you reboot the Telecommuting Module, all active sessions (including SIP sessions) are torn down.

Restart the SIP Module

When you restart the SIP module, all active SIP sessions are torn down and all SIP registrations are removed.

Reboot Your 3Com VCX IP Telecommuting Module

When this button is pressed, the Telecommuting Module will immediately reboot.

All active sessions, including SIP sessions, will be torn down at the reboot.

Restart the SIP Module

When this button is pressed, the SIP module of the Telecommuting Module will restart and all SIP registrations will be removed.

All active SIP sessions will be torn down and all SIP registrations will be removed at the restart.

Chapter 11. Logging

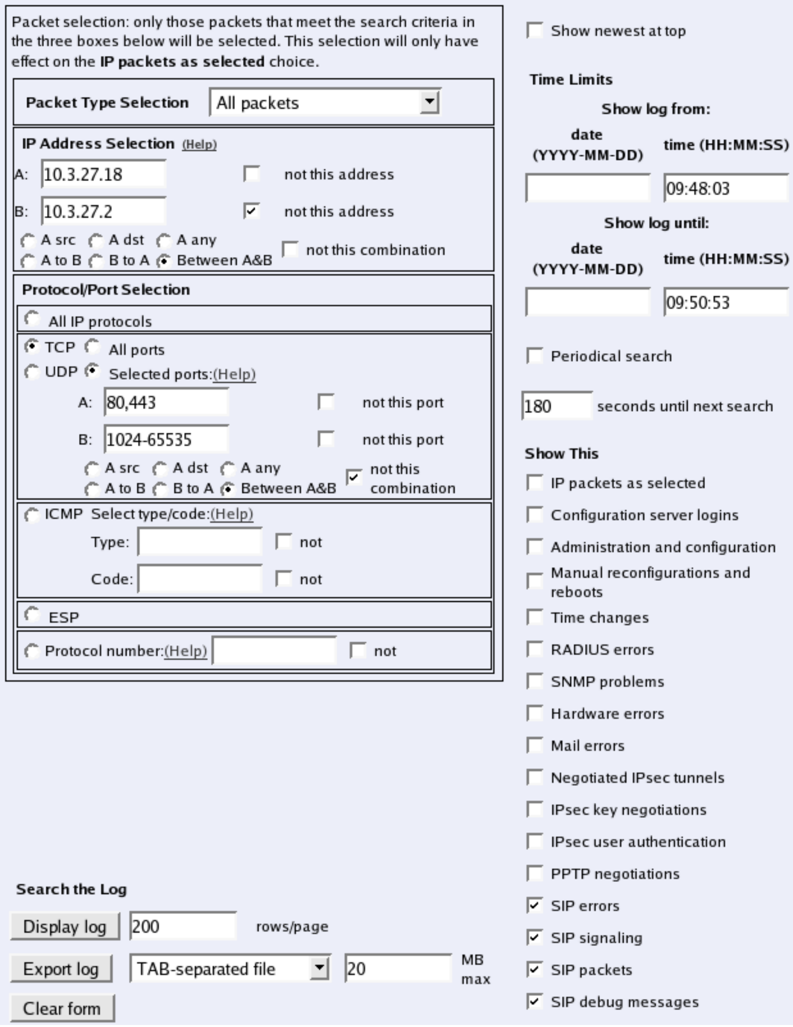
3Com VCX IP Telecommuting Module can log different types of traffic, attempts to connect and other events. You can select to have the logs stored on the Telecommuting Module's local hard drive, in which case they can be queried. When the Telecommuting Module's hard drive gets full, it removes the oldest data to make space for saving new data.

You can also clear the logs manually by running the installation program (see chapter 2, Installing 3Com VCX IP Telecommuting Module) and select to **Reset the rest of the configuration** and **3. Revert to the factory configuration**. NB: This will clear the logs, remove all configuration on the Telecommuting Module and then apply the configuration set during the running of the installation program.

For traffic that uses the TCP protocol, only the first packet is logged, the one that initiates the connection. For the UDP and ICMP protocols, all packets are logged. In this section, you specify what you want to log and alarm and study the logs. Logging of events is also configured under **Access Control**.

Display Log

On this page, you can view the logs. You select the type of traffic you want to study by selecting which packets should be processed. You can select packets by IP addresses, IP protocols and whether they were allowed to pass the Telecommuting Module or not. Only packets matching all three criteria are shown.



Packet selection: only those packets that meet the search criteria in the three boxes below will be selected. This selection will only have effect on the **IP packets as selected** choice.

Packet Type Selection All packets ▾

IP Address Selection (Help)

A: 10.3.27.18 □ not this address

B: 10.3.27.2 ☑ not this address

○ A src ○ A dst ○ A any
○ A to B ○ B to A ● Between A&B □ not this combination

Protocol/Port Selection

○ All IP protocols

● TCP ○ All ports
○ UDP ● Selected ports:(Help)

A: 80,443 □ not this port

B: 1024-65535 □ not this port

○ A src ○ A dst ○ A any
○ A to B ○ B to A ● Between A&B ☑ not this combination

○ ICMP Select type/code:(Help)

Type: □ not

Code: □ not

○ ESP

○ Protocol number:(Help) □ not

Search the Log

Display log 200 rows/page

Export log TAB-separated file ▾ 20 MB max

Clear form

□ Show newest at top

Time Limits

Show log from:

date (YYYY-MM-DD) time (HH:MM:SS) 09:48:03

Show log until:

date (YYYY-MM-DD) time (HH:MM:SS) 09:50:53

□ Periodical search

180 seconds until next search

Show This

□ IP packets as selected
□ Configuration server logins
□ Administration and configuration
□ Manual reconfigurations and reboots
□ Time changes
□ RADIUS errors
□ SNMP problems
□ Hardware errors
□ Mail errors
□ Negotiated IPsec tunnels
□ IPsec key negotiations
□ IPsec user authentication
□ PPTP negotiations
☑ SIP errors
☑ SIP signaling
☑ SIP packets
☑ SIP debug messages

Packet Type Selection

You can limit the selection to only allowed packets or rejected/discarded packets, or a subset of these. For example, you can select allowed, un-NAT:ed packets only.

IP Address Selection

You can limit the selection by specifying certain IP addresses.

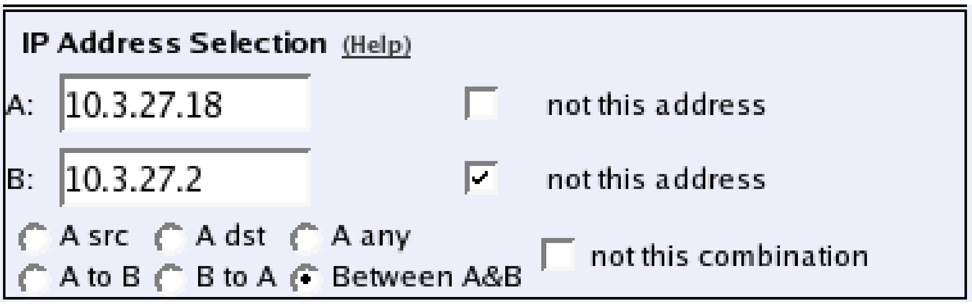
In these fields, enter a single IP address (e. g., 10.3.27.3), a range of IP addresses (e. g., 10.3.27.1-10.3.28.254), an IP address followed by a netmask (e. g.,10.3.27.0/24), a combination of these, or nothing at all. If a field is empty, all IP addresses are selected.

If you want to study all traffic except the one to or from a specific computer or group of computers, enter the IP address(es) here and mark the "not this address" box.

The selection can be modified by the control boxes under the fields A and B:

A src	Packets from the IP address in field A matches. Field B is ignored.
A dst	Packets to the IP address in field A matches. Field B is ignored.
A any	Packets to or from the IP address in field A matches. Field B is ignored.
A to B	Packets from A to B matches.
B to A	Packets from B to A matches.
Between A&B	Packets from A to B, or from B to A, matches.
not this combination	Packets that do not match the given combination of A and B are shown in the log.

If you, for example, want to study all packets to or from 10.3.27.18, except those to the file server 10.3.27.2, you should fill in the form like this:



IP Address Selection (Help)

A: 10.3.27.18 □ not this address

B: 10.3.27.2 ☑ not this address

○ A src ○ A dst ○ A any

○ A to B ○ B to A ● Between A&B

□ not this combination

Protocol/Port Selection

You can limit the selection by specifying certain protocols.

All IP protocols

No restriction regarding protocols.

TCP/UDP

When selecting TCP or UDP, you can choose all packets or packets to certain ports only.

In these fields, you can enter a single port number (32), a range of port numbers (1-1023), a list of port numbers and ranges separated by commas (53, 1024-65535) or nothing at all. If the field is empty, any port will match. See appendix G, Lists of ports, ICMP and protocols, for more information on port numbers.

If you want to study all traffic except the one to or from a specific port or group of ports, enter the port number(s) here and mark the "not this port" box.

The selection can be modified by the control boxes under the fields A and B:

A src	Packets from the port number in field A matches. Field B is ignored.
A dst	Packets to the port number in field A matches. Field B is ignored.
A any	Packets to or from the port number in field A matches. Field B is ignored.

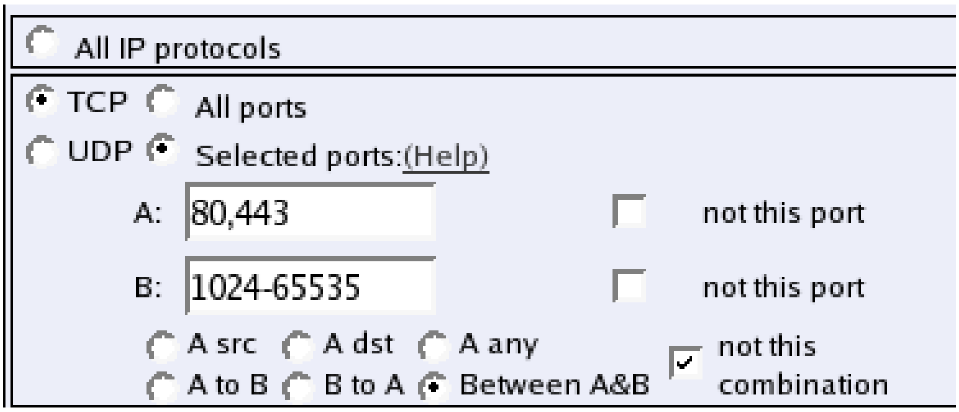
A to B
Packets from A to B matches.

B to A
Packets from B to A matches.

Between A&B
Packets from A to B, or from B to A, matches.

not this combination
Packets that do not match the given combination of A and B are shown in the log.

If you, for example, want to search for all packets to a web server, but not packets on the "normal" client and server ports in your environment, fill in the form like this:



○ All IP protocols

● TCP ○ All ports

○ UDP ● Selected ports:(Help)

A: 80,443 □ not this port

B: 1024-65535 □ not this port

○ A src ○ A dst ○ A any

○ A to B ○ B to A ● Between A&B

☑ not this combination

ICMP

ICMP packets contain a type field and a code field. When searching for ICMP packets, you can select all packets or only those matching certain criteria.

In the type and code fields, you can enter a single number (e. g., 5), a range of numbers (e. g., 5-10), a list of numbers and ranges, separated by commas (e. g., 5, 10-20) or nothing at all. If the field is empty, any type or code will match. See appendix G, Lists of ports, ICMP and protocols, for more information on ICMP types and codes.

If you want to study all traffic except the one of a certain type/code, enter the type/code number(s) here and mark the "not" box.

ESP

ESP is an authentication/encryption protocol. Select this if you want to search for encrypted packets.

Note that you must have selected a log class which saves to local file, for encrypted packets, to be able to display them here.

Protocol number

Here, you enter the number(s) of the protocols you want to search for. You can enter a single number (e. g., 5), a range of numbers (e. g., 5-10), a list of numbers and ranges, separated by commas (e. g., 5, 10-20) or nothing at all. If the field is empty, any protocol will match. See appendix C, Lists of Reserved Ports, ICMP Types and Codes, and Internet Protocols, for more information on protocol numbers.

If you want to study all traffic except the one over a certain protocol or protocols, enter the protocol number(s) here and mark the "not" box.

Beside the boxes

On the right-hand side of the boxes, select time interval and event for the log display.

Show newest at top

Choosing Show newest at top will display the log in reverse order, i. e., the latest log event will be displayed first.

Time Limits

You can limit the selection by a time interval.

The date is written as a year with two or four digits, month (01-12) and day (01-31). The optional punctuation between year, month and day must be dash (-). Time is written as two digits for the hour, two digits for the minute and possibly two digits for the second, although the seconds can be left out. The optional punctuation between hours, minutes and seconds must be colon (:) or period (.).

Show log from

You can enter a date, a time or both to set an interval for the log display. If you leave the date field blank and enter a time in the corresponding time field, today's date is used. If you leave the time field blank and enter a date in the date field, the time is set to 00:00:00. If both fields are left blank, all events back to the log start will be displayed.

Show log until

You can enter a date, a time or both to set an interval for the log display. If you leave the date field blank and enter a time in the corresponding time field, today's date is used. If you leave the time field blank and enter a date in the date field, the time is set to 23:59:59. If both fields are left blank, all events until the latest log event will be displayed.

Periodical search

Periodical search will cause new events to appear automatically in the log display. You enter the time interval for updating in the **Seconds until next search** field. This will only affect log display on your screen.

Show This

You can select the events you want to search for. NB: You must select **IP packets as selected** to get a log display of the packets selected in the boxes.

Display log

Below the boxes you can choose to display the log on your computer screen or export it to a file. For screen display, enter the desired number of lines per page and press **Display log**.

Export log

You can also save the log to a file. Enter the maximum size of the log file. If you must have the latest log events, select **Show newest at top**.

You can choose between different file formats; TAB-separated file, comma-separated file and WELF (WebTrends Enhanced Log Format). These are text formats, which means that you can import the files in a text editor for analysis. TAB- and comma-separated files contain all information from the log file. WELF is an open standard used by several log analyzer tools. However, all WELF compatible syslog messages will not be exported.

WELF uses the Telecommuting Module name you enter on the **Basic Configuration** page. Some WELF applications have licenses restricted to a certain number of Telecommuting Modules. This can cause trouble if you change the name of your Telecommuting Module.

If you export a log to WELF with **Show newest at top** selected, this may become troublesome when using some WELF applications, which cannot handle events in reverse order.

Press **Export log** and enter the file name and path to export to file.

Clear form

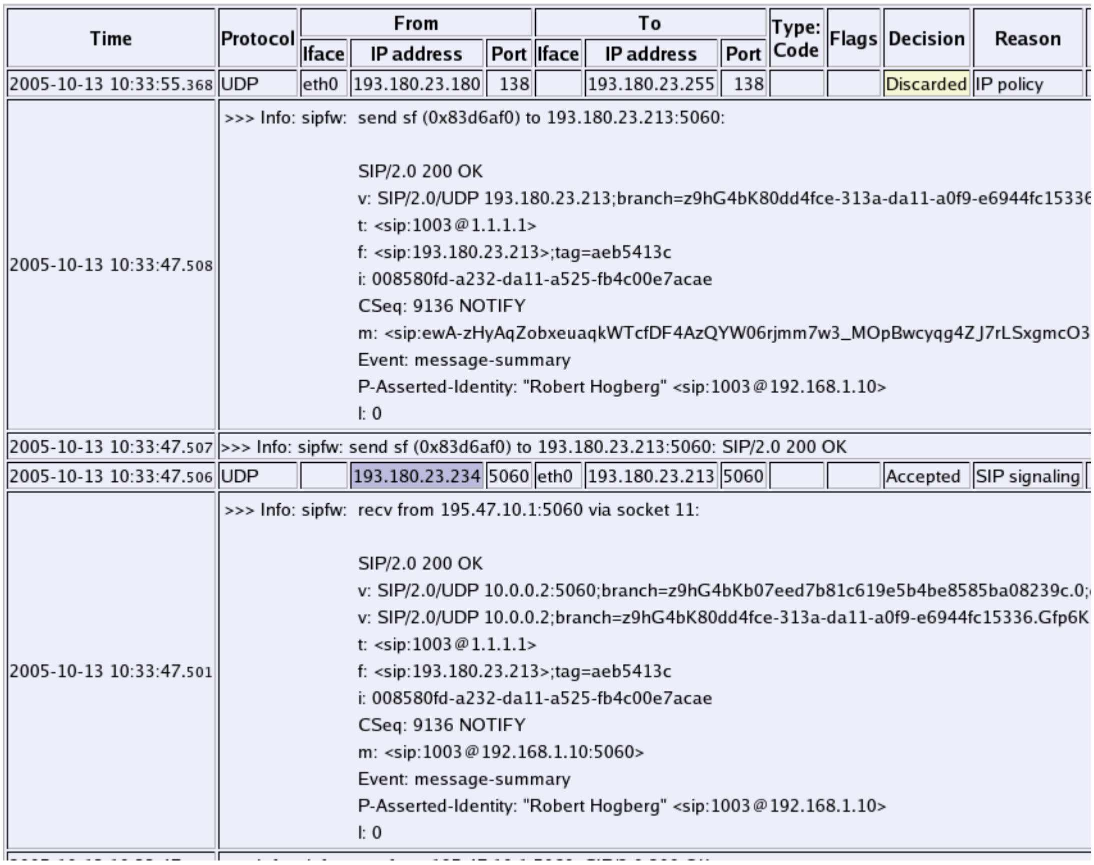
Resets the form.

The log

The log shows every packet and event on a separate row.

The rows show the date and time, type of protocol, from interface, computer and port, to interface, computer and port, ICMP type for ICMP traffic, flags, whether the packet was accepted, rejected or discarded, and the reason for this. For TCP traffic, and for UDP traffic which is session managed, only the connection packet is displayed. SIP media streams are not logged.

The Telecommuting Module’s own IP address is displayed in the log with a purple background color. Rejected and discarded packets are displayed with a yellowish background.



Time	Protocol	From			To			Type: Code	Flags	Decision	Reason
		Iface	IP address	Port	Iface	IP address	Port				
2005-10-13 10:33:55.368	UDP	eth0	193.180.23.180	138		193.180.23.255	138			Discarded	IP policy
2005-10-13 10:33:47.508	>>> Info: sipfw: send sf (0x83d6af0) to 193.180.23.213:5060: SIP/2.0 200 OK v: SIP/2.0/UDP 193.180.23.213;branch=z9hG4bK80dd4fce-313a-da11-a0f9-e6944fc15336 t: <sip:1003@1.1.1.1> f: <sip:193.180.23.213>;tag=aeb5413c i: 008580fd-a232-da11-a525-fb4c00e7acae CSeq: 9136 NOTIFY m: <sip:ewA-zHyAqZobxeuaqkWTcfDF4AzQYW06rjmm7w3_MOpBwcyqg4ZJ7rLSxgmcO3 Event: message-summary P-Asserted-Identity: "Robert Hogberg" <sip:1003@192.168.1.10> l: 0										
2005-10-13 10:33:47.507	>>> Info: sipfw: send sf (0x83d6af0) to 193.180.23.213:5060: SIP/2.0 200 OK										
2005-10-13 10:33:47.506	UDP		193.180.23.234	5060	eth0	193.180.23.213	5060			Accepted	SIP signaling

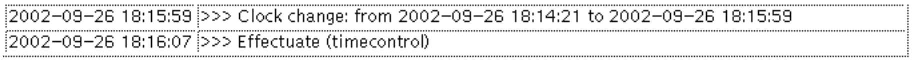
2005-10-13 10:33:47.501	>>> Info: sipfw: recv from 195.47.10.1:5060 via socket 11:
	
	SIP/2.0 200 OK
	v: SIP/2.0/UDP 10.0.0.2:5060;branch=z9hG4bKb07eed7b81c619e5b4be8585ba08239c.0;
	v: SIP/2.0/UDP 10.0.0.2;branch=z9hG4bK80dd4fce-313a-da11-a0f9-e6944fc15336.Gfp6K
	t: <sip:1003@1.1.1.1>
	f: <sip:193.180.23.213>;tag=aeb5413c
	i: 008580fd-a232-da11-a525-fb4c00e7acae
	CSeq: 9136 NOTIFY
	m: <sip:1003@192.168.1.10:5060>
	Event: message-summary
	P-Asserted-Identity: "Robert Hogberg" <sip:1003@192.168.1.10>
	l: 0										

The following flags are used:

S	SYN	Request for connection
A	ACK	Response to a previous packet
U	Urgent	Contains out-of-band data
P	Push	Packets that must be delivered quickly
F	FIN	Disconnect request
R	RST	Reset - response to incorrect packet

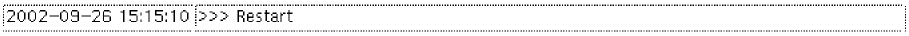
For more information on flags, see RFC 793.

When the clock is reset, the log shows this on a separate line like this:



```
2002-09-26 18:15:59 >>> Clock change: from 2002-09-26 18:14:21 to 2002-09-26 18:15:59
2002-09-26 18:16:07 >>> Effectuate (timecontrol)
```

If the Telecommuting Module is restarted, the log shows this on a line like this:

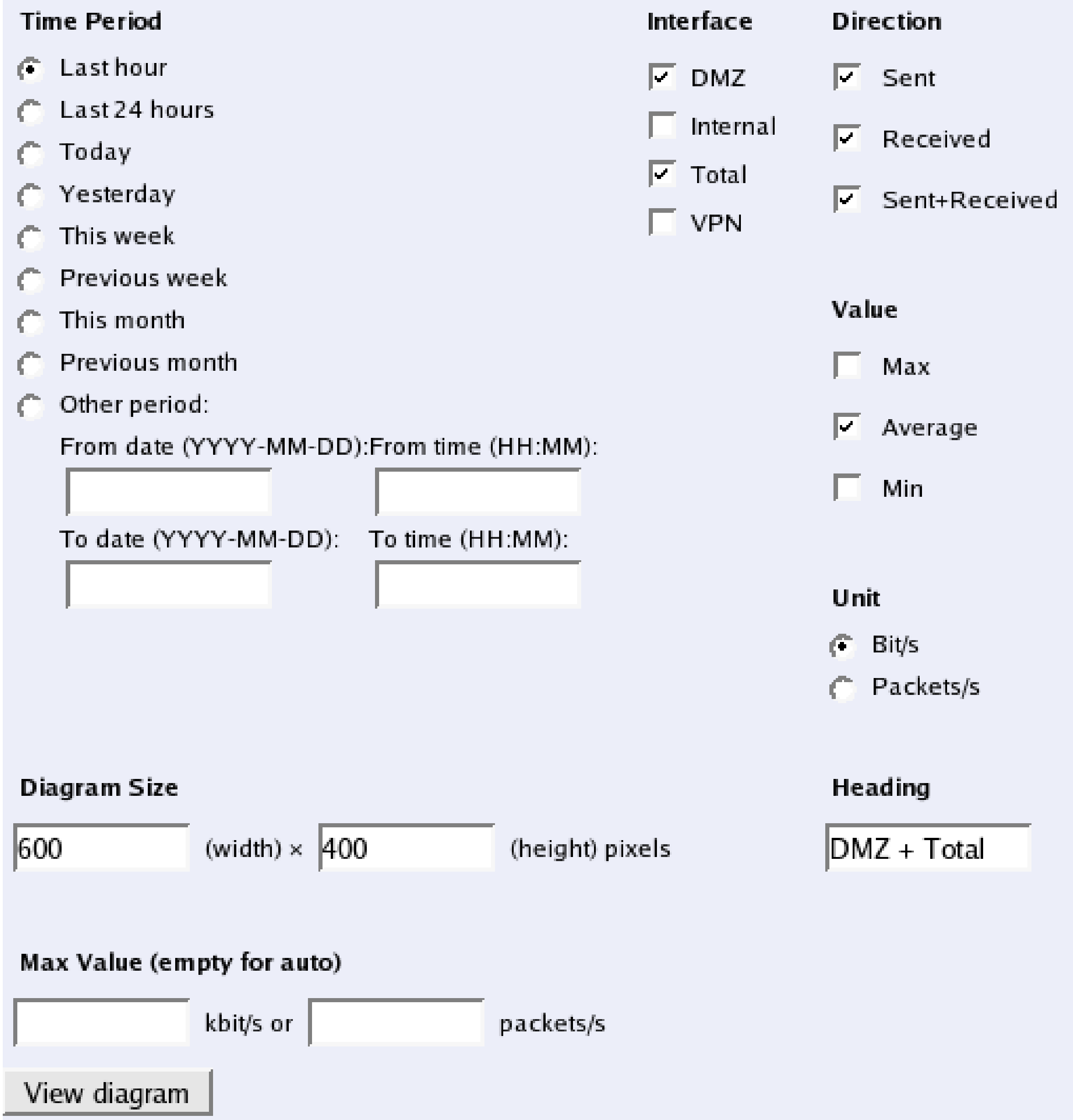


```
2002-09-26 15:15:10 >>> Restart
```

Display Load

Display Load shows statistics on the traffic load to and from the Telecommuting Module’s interfaces.

Once every minute the load on all interfaces is scanned and saved to a local file. Every file contains 240 samples and a file generation consists of 42 files. The first generation of files contains samples for the last week (approximately). Every new file generation is created by merging two consecutive samples, enabling the storing of samples for the double time period in the same disk space. Merging the samples include calculation of the minimum, average and maximum values for the time interval covered by the samples. After ten generations (about 19 years) the samples are deleted.



Time Period

● Last hour
○ Last 24 hours
○ Today
○ Yesterday
○ This week
○ Previous week
○ This month
○ Previous month
○ Other period:

From date (YYYY-MM-DD): From time (HH:MM):
To date (YYYY-MM-DD): To time (HH:MM):

Interface

☑ DMZ
□ Internal
☑ Total
□ VPN

Direction

☑ Sent
☑ Received
☑ Sent+Received

Value

□ Max
☑ Average
□ Min

Unit

● Bit/s
○ Packets/s

Diagram Size

600 (width) × 400 (height) pixels

Heading

DMZ + Total

Max Value (empty for auto)

kbit/s or packets/s

Time Period

Select a time period or enter a period of your own choice in the bottom fields. The date is written as a year with two or four digits, month (01-12) and day (01-31). The optional punctuation between year, month and day must be dash (-). Time is written as two digits for the hour, two digits for the minute and possibly two digits for the second, although the seconds can be left out. The optional punctuation between hours, minutes and seconds must be colon (:) or period (.).

Interface

You can select one or more of the Telecommuting Module’s interfaces or the total traffic. Selecting more than one interface will generate one graph per interface. You can also select to view only VPN traffic.

Direction

Select one or more of **Sent**, **Received** and **Sent+Received**. Each selection generates a separate graph in the diagram.

Value

Select maximum, average or minimum value of each sample period. If viewing load for time periods within the last week, all three selections will result in the same graph.

Unit

Select between displaying packets/second or bits/second. The graphs may look different, because all packets aren't the same size.

Diagram Size

Enter the desired width and height of the resulting load diagram.

Heading

You can enter a heading for the load diagram. This is useful if you view several diagrams and save them.

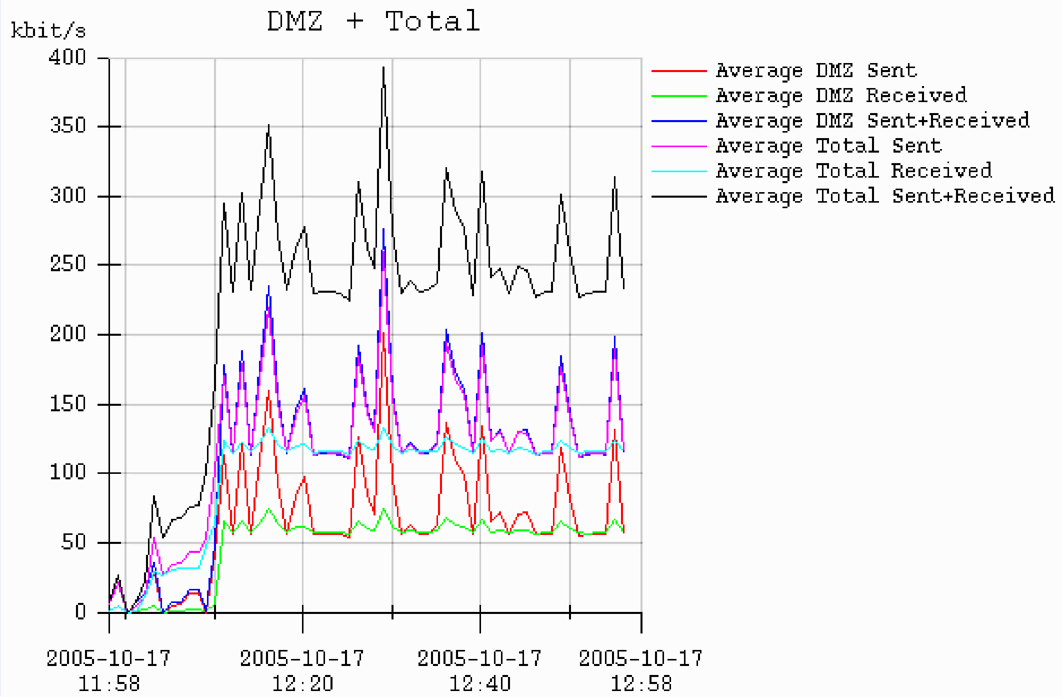
Max Value

Enter the maximum value to show in the diagram. If no value is entered, the diagram automatically scales to a suitable value.

View diagram

Creates a diagram at the top of the page.

For each combination of selections, a graph will be generated. Example: You selected **Network Interface 1** and **Total** as interfaces, and **Sent**, **Received** and **Sent+Received** as directions. This will generate a total of six graphs of different colours in the diagram.

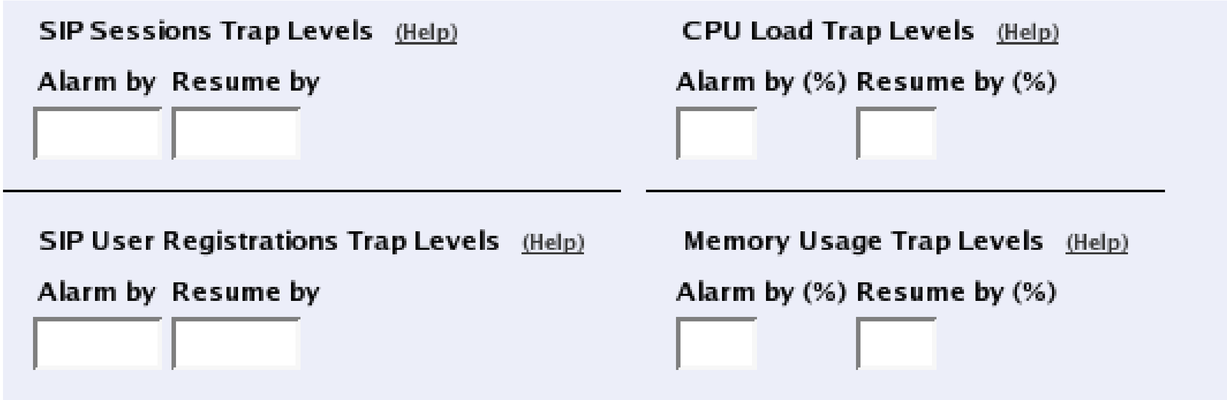


Resource Monitoring

Your Telecommuting Module can send SNMP traps when usage passes certain levels. Set the levels on this page. The trap receivers are configured on the **SNMP** page.

For each usage, there is an **Alarm by** and a **Resume by** level. When the usage hits the **Alarm by** level, the Telecommuting Module sends a trap about this and locks the trap sending for that usage, which means that as long as the level stays high, no more traps are sent. When the level goes down to below the **Resume by** level, the lock is released. Next time the **Alarm by** level is reached, a new trap is sent.

To avoid excessive trap sending, it is recommended that the **Alarm by** and **Resume by** level for a resource are not set too close.



SIP Sessions Trap Levels (Help)

Alarm by Resume by

CPU Load Trap Levels (Help)

Alarm by (%) Resume by (%)

SIP User Registrations Trap Levels (Help)

Alarm by Resume by

Memory Usage Trap Levels (Help)

Alarm by (%) Resume by (%)

SIP Sessions Trap Levels

Enter the SIP sessions levels here. When the number of SIP sessions reaches the Alarm by level, an SNMP trap is sent.

SIP User Registrations Trap Levels

Enter the SIP user registrations levels here. When the number of registered SIP users reaches the Alarm by level, an SNMP trap is sent.

CPU Load Trap Levels

Enter the CPU load levels here. When CPU usage increases above the Alarm by limit, an SNMP trap is sent.

Memory Usage Trap Levels

Enter the memory usage levels here. When memory usage increases above the Alarm by limit, an SNMP trap is sent.

Save

Saves the Resource Monitoring configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

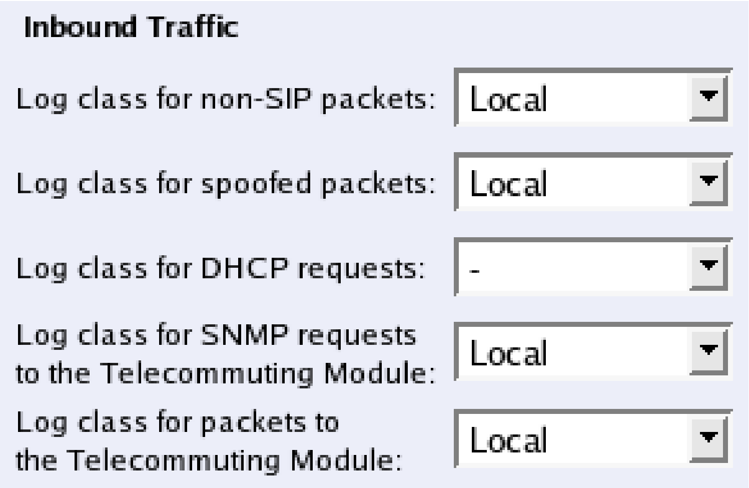
Logging Configuration

Your 3Com VCX IP Telecommuting Module generates log messages for various events and for the traffic to and through the Telecommuting Module. Here, you select log classes to state what to do with the log messages.

When an IP packet is received by the Telecommuting Module, a log message is generated, containing sender and receiver IP addresses and other information such as the protocol used and if the packet was allowed, rejected or discarded. The Telecommuting Module then uses the log settings for Configuration Transport and Log class for non-SIP packets to know how to process the log message.

The Telecommuting Module also produces log messages for SIP-related and VPN-related events as well as administrator events (when the administrator logs on or when a setting is changed). Here, you configure what will happen to these log messages.

Inbound traffic



Inbound Traffic

Log class for non-SIP packets: Local

Log class for spoofed packets: Local

Log class for DHCP requests: -

Log class for SNMP requests to the Telecommuting Module: Local

Log class for packets to the Telecommuting Module: Local

Log class for non-SIP packets

Here, you select a log class for packets which are neither SIP packets, SIP session media streams, or Telecommuting Module administration traffic and are therefore processed by the **IP policy** (discard or reject) that you selected on the **Basic Configuration** page.

Log class for spoofed packets

Here, you select a log class for packets with obviously spoofed addresses. A spoofed IP address can be a non-existing IP address on a network connection or packets where the sender or receiver address is an IP address in the range 127.0.0.0 - 127.255.255.255.

Log class for DHCP requests

Here, you select a log class for DHCP requests. DHCP is a protocol used for dynamic allocation of IP addresses. Requests are sent by broadcast from computers wanting an IP address to a DHCP server. The Telecommuting Module logs all DHCP related packets using the log class you select here. There are usually a lot of these packets, so we recommend using the log class "None", meaning that no packets are logged at all.

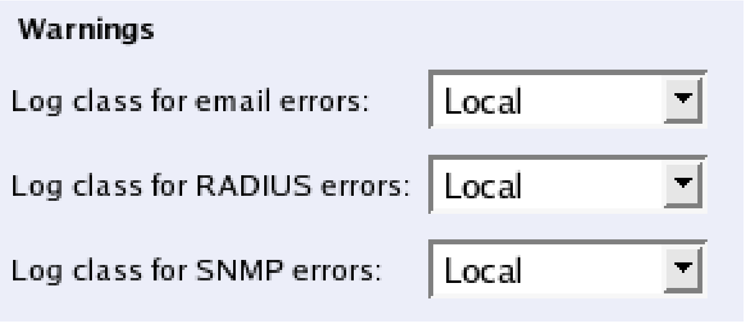
Log class for SNMP requests to the Telecommuting Module

Here, you select a log class for SNMP requests to the Telecommuting Module. *SNMP* is a protocol for monitoring network equipment such as firewalls and routers.

Log class for packets to the Telecommuting Module

Here, you select a log class for traffic addressed to the Telecommuting Module itself. Even if you select not to log this traffic, the configuration traffic to the Telecommuting Module will be logged according to the log class set on the **Access Control** page.

Warnings



Warnings

Log class for email errors: Local

Log class for RADIUS errors: Local

Log class for SNMP errors: Local

Log class for hardware errors

Some Telecommuting Modules have hardware monitoring, and will generate log messages when the hardware fails in some way. Here, you select a log class for these messages.

Log class for email errors

If the Telecommuting Module is unable to send email messages, for example, if the mail server won't reply, the Telecommuting Module generates a log message. Here, you select a log class for these messages.

Log class for RADIUS errors

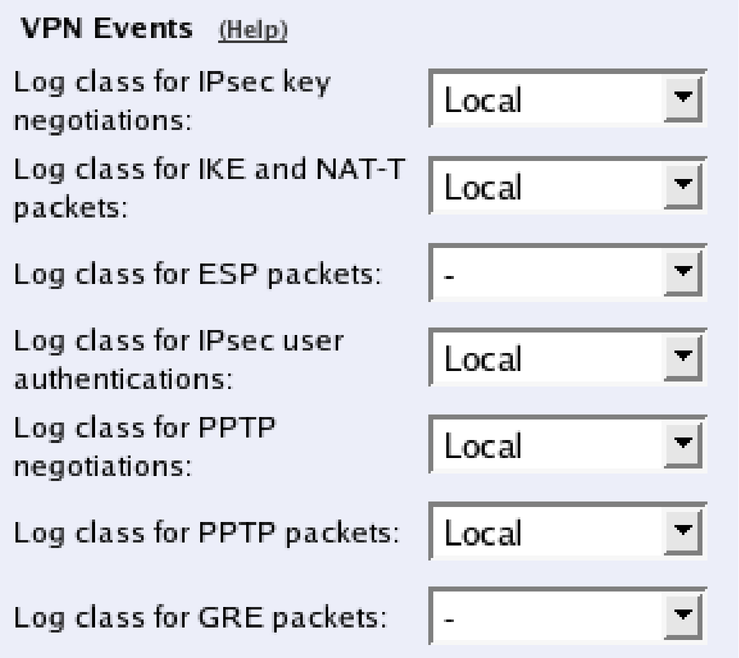
Radiusmux (see the RADIUS section in chapter 6, Basic Configuration) generates messages for incomprehensible RADIUS server responses and for denying logins on account of permissions (a user defined for road warriors is not automatically allowed to log onto the configuration server). Here, you select a log class for these messages.

Log class for SNMP errors

The Telecommuting Module generates messages about SNMP errors. Here, you select a log class for these messages.

VPN events

The same settings can also be found on the **IPSec Settings** and **PPTP** pages under **Virtual Private Networks**.



VPN Events (Help)

Log class for IPsec key negotiations: Local

Log class for IKE and NAT-T packets: Local

Log class for ESP packets: -

Log class for IPsec user authentications: Local

Log class for PPTP negotiations: Local

Log class for PPTP packets: Local

Log class for GRE packets: -

Log class for IPsec key negotiation

Here, you set the log class for new negotiations of IPsec connections keys.

Log class for IKE and NAT-T packets

Here, you set the log class for the packets used for IKE key negotiations and for NAT-T packets. As they both use the same port on the Telecommuting Module, it will log both using the same log class.

Log class for ESP packets

Specify what log class the Telecommuting Module should use for encrypted packets (ESP packets to the Telecommuting Module). Logging of encrypted packets will generate a lot of log events.

Log class for IPsec user authentications

Here, you set the log class for Telecommuting Module messages about road warrior authentications via RADIUS and their disconnections.

Log class for PPTP negotiations

The Telecommuting Module generates log messages about the progress of the PPTP negotiations. Here, you select a log class for these messages.

Log class for PPTP packets

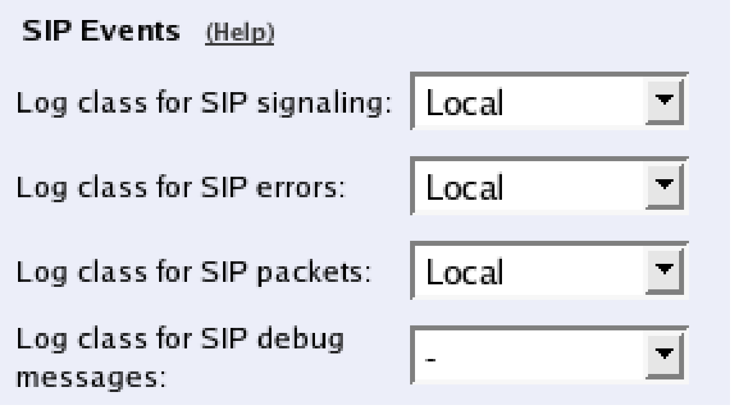
PPTP clients wanting to establish a VPN tunnel connects to the Telecommuting Module on port 1723. Here, you select a log class for these packets.

Log class for GRE packets

The encrypted traffic through the VPN tunnel is sent as GRE packets. Here, you select a log class for these packets.

SIP events

The same settings can also be found on the **Basic** page under **SIP Services**.



SIP Events (Help)

Log class for SIP signaling: Local

Log class for SIP errors: Local

Log class for SIP packets: Local

Log class for SIP debug messages: -

Log class for SIP errors

The Telecommuting Module sends a message if there are any SIP errors. Select a log class for these log messages.

Log class for SIP signaling

For each SIP packet, the Telecommuting Module generates a message, containing the sender and receiver of the packet and what type of packet it is. Select a log class for these log messages.

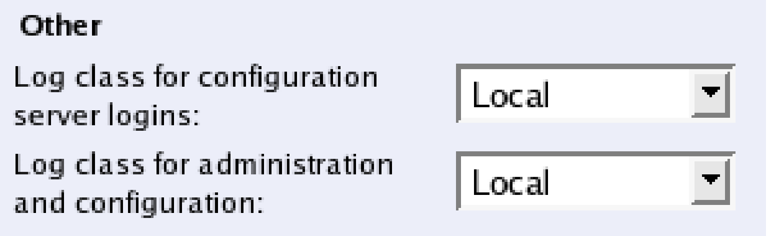
Log class for SIP packets

The Telecommuting Module logs all SIP packets (one SIP packet is many lines). Select a log class for the SIP packets.

Log class for SIP debug messages

The Telecommuting Module logs a lot of status messages, for example the SIP initiation phase of a reboot. Select a log class for these messages.

Other



Other

Log class for configuration server logins: Local

Log class for administration and configuration: Local

Log class for configuration server logins

Each time a user logs onto the Telecommuting Module configuration server, a message is generated, containing information about the type of login and more. Here, you select a log class for these messages.

Log class for administration and configuration

Each time a user logs onto the Telecommuting Module configuration server, a message is generated, containing information about the type of login and more. Here, you select a log class for these messages.

Save

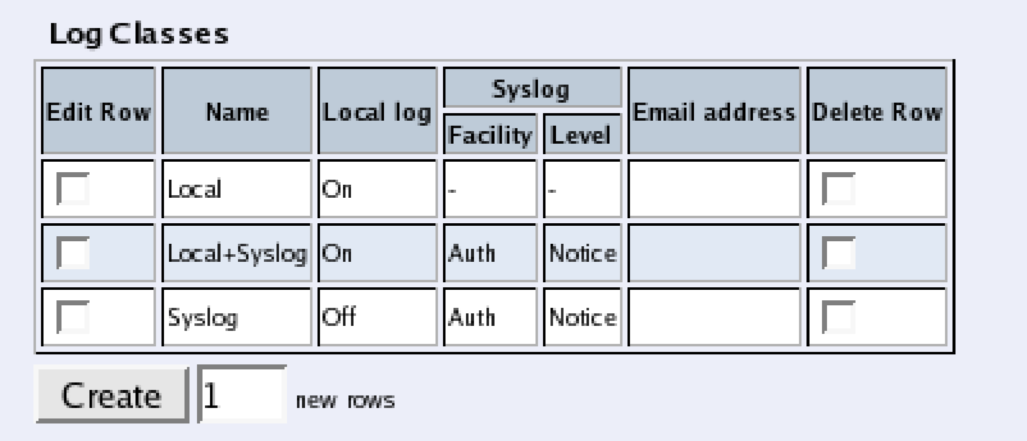
Saves the Logging Configuration configuration to the preliminary configuration.

Cancel

Reverts all of the above fields to their previous configuration.

Log Classes

Log classes determine the handling of traffic logs, other event logs and alarms. You can select no logging, log to a local file (on the Telecommuting Module), send the log messages via syslog to a syslog server and send the log messages as emails. When configuring logging on all other pages, you select between the different log classes defined here.



Log Classes

Edit Row	Name	Local log	Syslog		Email address	Delete Row
			Facility	Level		
□	Local	On	-	-		□
□	Local+Syslog	On	Auth	Notice		□
□	Syslog	Off	Auth	Notice		□

Name

Here, you give the log class a **Name**.

Log locally?

Select to save log messages to a local file on the Telecommuting Module. Locally saved logs can be searched on the **Display Log** page. **Yes** will cause the log messages using this log class to be saved to file. **No** will cause the log messages not to be saved on the Telecommuting Module and thus also not possible to search under **Display Log**.

Syslog

Syslog sends log messages to a syslog server. You enter the IP address of the syslog server on the **Log Sending** page. Select **Facility** and **Level** for the syslog message. See your syslog server manual for more information on facility and level. Selecting **None** for both **Facility** and **Level** turns the syslog alternative off. **None** must be selected for both or none of **Facility** and **Level**. The Telecommuting Module will display a red warning text until both or none of them are **None**.

Email address

The Telecommuting Module may also send the log messages by email to one or more email addresses. Enter the addresses here (separated by comma). You must specify a mail server on the **Log Sending** page for the Telecommuting Module to send the emails properly.

Delete Row

If you select this box, the row is deleted when you click on **Add new rows** or **Save**.

Create

Enter the number of new rows you want to add to the table, and then click on **Create**.

Save

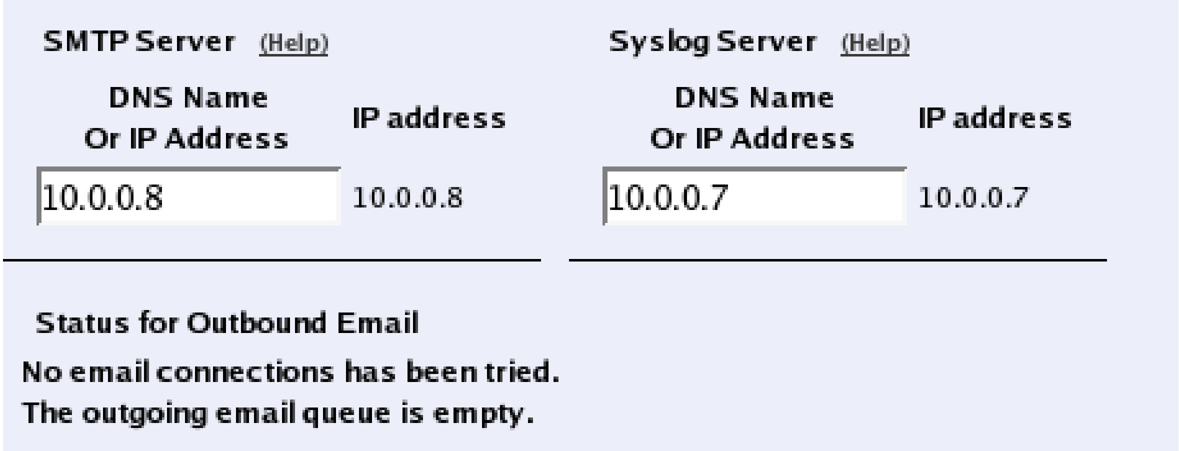
Saves the Log Classes configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Log Sending

In 3Com VCX IP Telecommuting Module, there are two ways of sending log messages automatically to somewhere outside the box; to send to a syslog server and to send an email to an email address. If either method is used, the Telecommuting Module must know where to send this. On this page, servers for log sending are configured.



SMTP Server (Help)

DNS Name Or IP Address	IP address
10.0.0.8	10.0.0.8

Syslog Server (Help)

DNS Name Or IP Address	IP address
10.0.0.7	10.0.0.7

Status for Outbound Email

No email connections has been tried.
The outgoing email queue is empty.

SMTP Server

Here, you set an SMTP server for the log messages that the Telecommuting Module generates. This server will send the email messages to the email addresses set on the **Log Classes** page. If the connection between the Telecommuting Module and the SMTP server isn’t working, an error message will be shown on this page, and be logged according to the log class set on the **Logging Configuration** page. However, no error message will be shown here if the primary SMTP server can’t connect to other mail servers. Therefore you should test if email log messages to the addresses set under **Log Classes** really reach their destination addresses.

Every log message does not create a separate email; the Telecommuting Module collects log messages and sends them every 5 minutes. The first message is sent within a minute.

Email sent from the Telecommuting Module has the From address "3Com VCX IP Telecommuting Module".

Enter the DNS name or IP address of the SMTP server.

Status for outbound email

A message is shown here if the Telecommuting Module can’t connect to the mail server selected under **SMTP server**, or if other errors concerning email occur. .

Syslog Server

Here, you set a syslog server for the syslog messages that the Telecommuting Module generates. This is the computer which receives and stores the syslog log messages.

Enter the DNS name or IP address of the syslog server here.

Save

Saves the configuration for Log Sending to the preliminary configuration.

Cancel

Reverts the fields to the previous configuration.

Chapter 12. Failover

The 3Com VCX IP Telecommuting Module failover function makes it possible to have a hot standby unit which always has the current configuration and which automatically takes over when the active unit goes down. The two units become a *failover team*.

This function requires that one interface on the Telecommuting Module is dedicated for failover and can't be used for anything else.

Note: This means that failover can only be used when the Telecommuting Module is used in DMZ mode.

Specification of failover

This is a short description of what 3Com Failover can do and what is required to make it work.

Requirements

Failover requires two Telecommuting Modules,, and both units must run the same software version. Any expansion modules on the active unit must also be present on the standby.

The units must be located in a way which makes it possible to connect them with a cross-over network cable. You must also connect the other interface on the standby unit to the same router/switch as the active Telecommuting Module.

Features

The Failover function allows you to create failover teams out of two Telecommuting Modules, where one unit is active and the other a standby unit. The standby stays in constant contact with the active unit to check if it's working and to ask for new configuration whenever the configuration is changed on the active Telecommuting Module. When the active unit fails, the standby takes over, with the same configuration (including IP addresses).

If either of the units stops working, or if the active unit can't connect to the standby unit via the cross-over cable, the Telecommuting Module won't accept new changes to the configuration. This is because there is no way for the active Telecommuting Module to transfer the changes to the standby unit. If this should happen, and there is no way to reestablish the connection between the two units, the active unit must change mode to a standalone unit (which breaks the failover team) to allow changes in the configuration.

Update interval	30 s
Maximum failover time	30 s + time to apply configuration
TCP/UDP connections (session management) kept after failover	No
TCP/UDP connections (packet filter) kept after failover	Yes
SIP registrations kept after failover	Yes
SIP calls kept after failover	No

Failover Telecommuting Module setup

For the failover function to work properly, you must configure the Telecommuting Modules in the right way, and connect them correctly. Here is a short guide on how to do this.

Create a new failover team

To create a new failover team, you must initiate the two Telecommuting Modules in different ways. The first Telecommuting Module is made a member of the team by web interface configuration, the second is added to the team by means of connecting to it via the serial cable or console.

Telecommuting Module 1

The following procedure will produce a correctly configured Telecommuting Module 1 team member:

- Go to the **Failover Settings** page and select the interface which should be directly connected to the other Telecommuting Module as **Dedicated interface to use**. Check the **Dedicated network** to see that it doesn't clash with any of your internal networks.
- Press the **Create new team** button to create a new failover team with this Telecommuting Module as its first member. This will cause a reboot.

Telecommuting Module 2

To make Telecommuting Module 2 (the standby unit) a member of the failover team, you have to connect to it using the serial cable or console. See chapter 2, Installing 3Com VCX IP Telecommuting Module, for a thorough description on how to do this.

Log on from your terminal as *admin* and select **3. Become a failover team member**. Select the same interface as was selected as **Dedicated interface** for Telecommuting Module 1. All existing configuration will be removed and the Telecommuting Module will reboot. It will then obtain its configuration from Telecommuting Module 1.

Connecting the Telecommuting Modules

After installing the Telecommuting Modules, you must also connect them properly. They must be located close to each other, as they will be connected in parallel to all networks.

The interface on Telecommuting Module 1 which was reserved for failover should be connected to the corresponding interface on Telecommuting Module 2 using a crossover TP cable. If you for example selected Network Interface 2 as the **Dedicated interface to use**, you should connect Network Interface 2 on Telecommuting Module 1 with Network Interface 2 on Telecommuting Module 2.

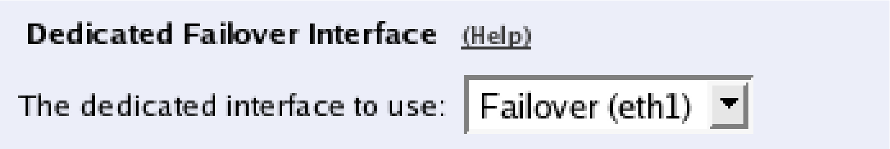
The other interface should be connected in parallel to the network on which the Telecommuting Module should operate. If you configured Network Interface 1 to be on the DMZ, both Network Interface 1 interfaces should be connected to the DMZ network. You can't have a router between any pair of interfaces; they must be located on the same logical IP network.

Failover Settings

Here, you configure the Telecommuting Module to enable it to communicate with the other unit of the failover team. Here is also where you change type between a standalone Telecommuting Module and one which is a team member.

Dedicated interface

For the Telecommuting Modules in the failover team to be able to synchronize configuration and check that the other unit is still functional, they need to communicate. The communication is sent over a dedicated interface on the Telecommuting Module. This interface can't be used for any other traffic.



Dedicated Failover Interface (Help)

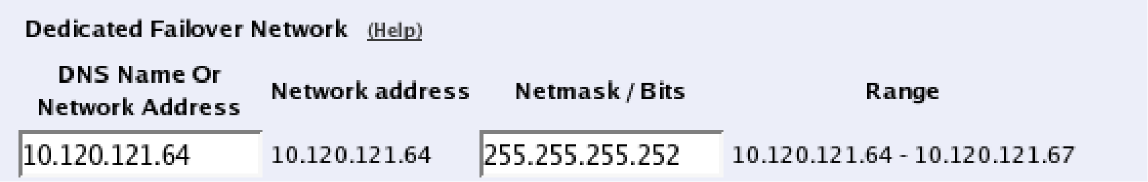
The dedicated interface to use: Failover (eth1)

The dedicated interface to use

Select the interface to be used for communication with the other Telecommuting Module of the team. This interface should be connected to the corresponding interface of the other Telecommuting Module using a crossover TP cable.

Dedicated network

The failover team needs a network to use for its communication. This network must contain at least four addresses (one for each Telecommuting Module, one network address and one broadcast address). You can dedicate a larger network if you like, but since the interfaces will be directly connected to each other, no more addresses will be used.



Dedicated Failover Network

DNS Name Or Network Address	Network address	Netmask / Bits	Range
10.120.121.64	10.120.121.64	255.255.255.252	10.120.121.64 - 10.120.121.67

DNS name or network address

In the **DNS name or network address** field, enter the DNS name or IP address of the dedicated network.

Network address

Shows the IP address of the **DNS name or network address** you entered in the previous field.

Netmask/bits

Netmask/bits is the netmask that will be used to specify the size of the dedicated network. You must use a netmask of at most 30 (255.255.255.252). See chapter 3, Configuring 3Com VCX IP Telecommuting Module, for instructions on writing the netmask.

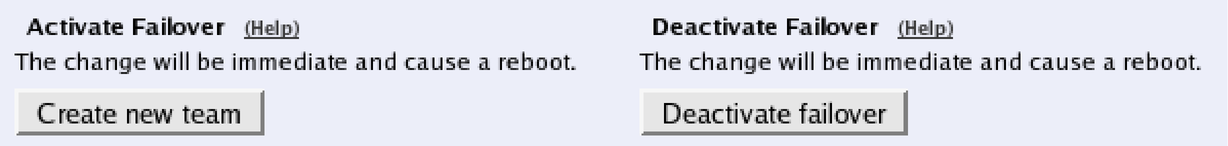
Range

The **Range** shows all IP addresses of the dedicated network. The range is calculated from the configuration under **DNS name or network address** and **Netmask/Bits**. Check that the correct information was entered in the **DNS name or network address** and **Netmask/Bits** fields.

Failover type

The Telecommuting Module can work **Standalone** or as a **Failover team member**. In Standalone mode, it works as a standard Telecommuting Module. As a Failover team member, it still performs the usual functionality, but in addition, it communicates with the other team member to transfer configuration when changed. The team members constantly check whether the other unit is alive.

Change failover type for the Telecommuting Module from standalone to team member or from failover team member to standalone. When you change type, the Telecommuting Module will reboot.



Activate Failover

The change will be immediate and cause a reboot.

Deactivate Failover

The change will be immediate and cause a reboot.

Create new team

Press **Create new team** to create a new failover team.

If the Telecommuting Module was standalone, it will reboot and then listen for its team partner on the dedicated interface, to transfer its configuration.

Deactivate failover

Disconnect the other Telecommuting Module in the team (or turn off the power) and press **Deactivate failover** to make the Telecommuting Module standalone again.

Save

Saves all Failover Settings configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

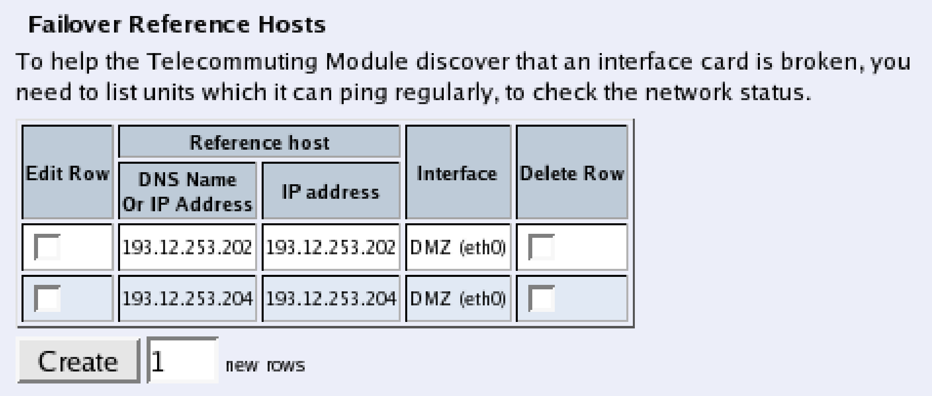
Look up all IP addresses again

Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

Reference Hosts

The standby unit in the failover pair can become active if a network interface on the active unit is faulty, as opposed to the case when the entire unit is down. For the Telecommuting Module to detect a faulty interface, it needs to be aware of some reference hosts which it should be able to contact.

On this page, enter IP addresses of reference hosts that will reply to ping from the Telecommuting Module. As faulty reference hosts will cause the failover pair to repeatedly change the active unit, you should select them with care. As an extra safety measure, it is recommended that you enter more than one host for each interface.



Failover Reference Hosts

To help the Telecommuting Module discover that an interface card is broken, you need to list units which it can ping regularly, to check the network status.

Edit Row	Reference host		Interface	Delete Row
	DNS Name Or IP Address	IP address		
□	193.12.253.202	193.12.253.202	DMZ (eth0)	□
□	193.12.253.204	193.12.253.204	DMZ (eth0)	□

Reference host

DNS name or IP address

The name/IP address of the reference host used to test this interface.

IP address

Shows the IP address of the **DNS name or IP address** you entered in the previous field.

Interface

Select the interface to be tested. The reference host entered on this line must be reachable via this interface, i.e. not located behind another interface of the Telecommuting Module.

Save

Saves all Reference Hosts configuration to the preliminary configuration.

Cancel

Clears and resets all fields in new rows and resets changes in old rows.

Look up all IP addresses again

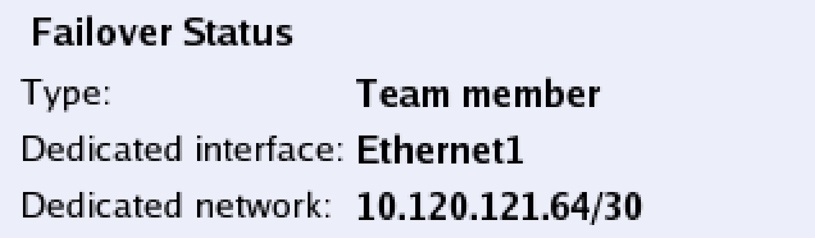
Looks up the IP addresses for all DNS names on this page in the DNS servers you entered on the **Basic Configuration** page.

Failover Status

Here the configuration used by the failover team is shown. Here, you can also view the status of the Telecommuting Modules in the team.

Failover Status

Here are the settings used by the Telecommuting Module for failover communication.



Failover Status

Type: **Team member**

Dedicated interface: **Ethernet1**

Dedicated network: **10.120.121.64/30**

Type

A Telecommuting Module can be **Standalone** or a **Team member**.

Dedicated interface

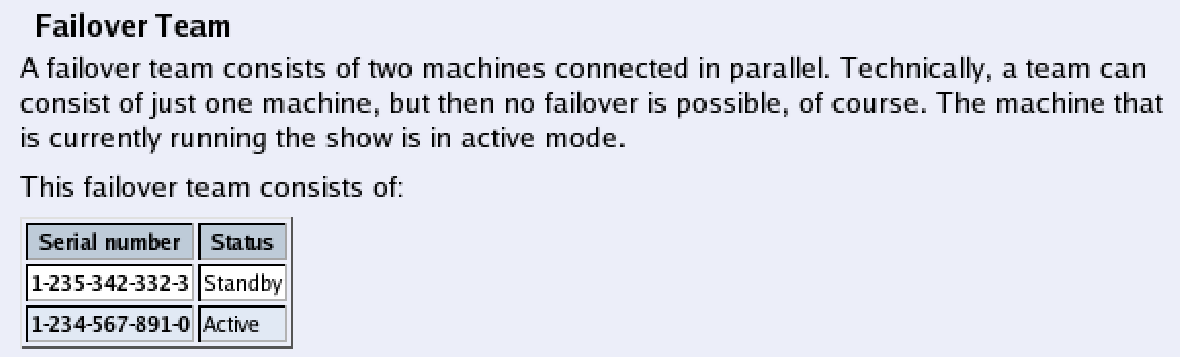
If the Telecommuting Module is a member of a failover team, the interface used for failover communication is shown here.

Dedicated network

If the Telecommuting Module is a member of a failover team, the network used for failover communication is shown here.

Failover team

Here, you can see a list of the members of this failover team and their status.



Failover Team

A failover team consists of two machines connected in parallel. Technically, a team can consist of just one machine, but then no failover is possible, of course. The machine that is currently running the show is in active mode.

This failover team consists of:

Serial number	Status
1-235-342-332-3	Standby
1-234-567-891-0	Active

Serial number

The serial number of each team member.

Status

Status for each team member. A Telecommuting Module can be **Active**, **Standby** or **Unavaliable**, which indicates that the Telecommuting Module is unaccessable. It could be turned off, failing for some reason or all cables could have been disconnected.

Leaving a failover team

If you for some reason want to quit using failover and use the Telecommuting Modules as standalone units, you must do things in the right order to release the team:

1. The **Standby** Telecommuting Module must be taken away first. Do this by turning the power off, disconnect all cables or log on as *admin* via the serial cable and select **4. Leave failover team and become standalone**.

2. Change type of the **Active** Telecommuting Module on the **Failover Settings** page by pressing the **Deactivate failover** button.

If you want to replace a unit in the failover team, you must first split the team and then make a new one.

Chapter 13. Tools

Under **Tools**, you find handy tools to troubleshoot the Telecommuting Module setup.

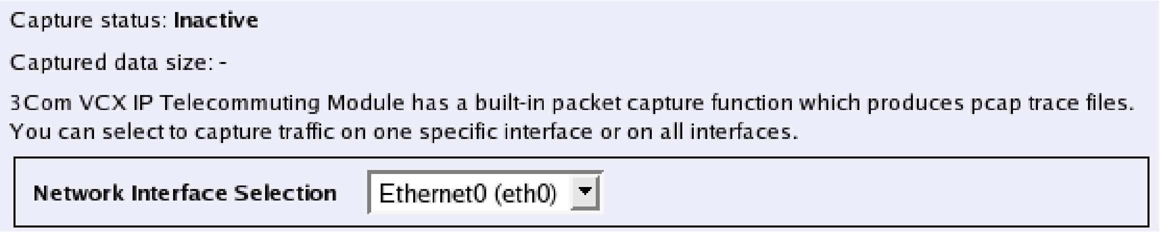
Packet Capture

3Com VCX IP Telecommuting Module has a built-in packet capturer which can produce pcap trace files. This sniffer will capture all IP packets according to your selections, even those you can’t see in the log (like RTP packets).

The Telecommuting Module capturer needs to be manually activated and deactivated. As this produces a log which usually contains a lot more packets than the standard log, it is advisable only to run the capturer for short time periods.

The capture of the packets can be downloaded and analyzed in any tool that handles pcap traces, like Ethereal.

Network Interface Selection



Capture status: **Inactive**

Captured data size: -

3Com VCX IP Telecommuting Module has a built-in packet capture function which produces pcap trace files. You can select to capture traffic on one specific interface or on all interfaces.

Network Interface Selection Ethernet0 (eth0)

Select on which interface or VLAN the sniffer should listen for packets. You can also select to listen on all interfaces.

Some network cards have VLAN hardware support. For this type of cards, incoming VLAN tagged traffic is not logged on the main interface, but only on the VLAN interface. Outgoing VLAN tagged traffic is logged on the main interface.

Other interfaces do not have VLAN hardware support. For this type of interface, VLAN traffic is logged on the main interface.

Currently, the only network cards in 3Com products to support VLAN are the Gigabit network cards.

IP Address Selection

You can limit the selection by specifying certain IP addresses.

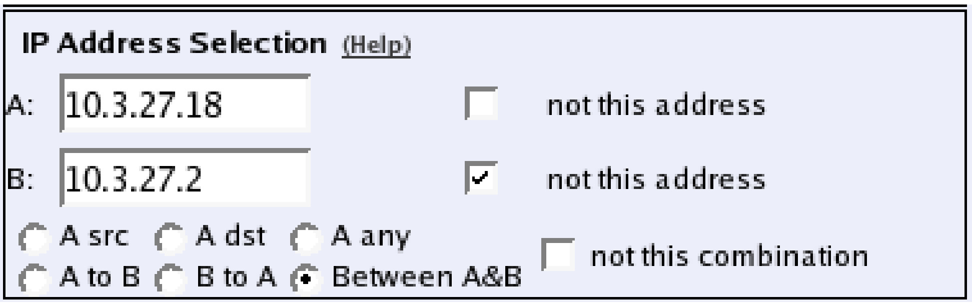
In these fields, enter a single IP address (e. g., 10.3.27.3), a range of IP addresses (e. g., 10.3.27.1-10.3.28.254), an IP address followed by a netmask (e. g.,10.3.27.0/24), a combination of these, or nothing at all. If a field is empty, all IP addresses are selected.

If you want to study all traffic except the one to or from a specific computer or group of computers, enter the IP address(es) here and mark the "not this address" box.

The selection can be modified by the control boxes under the fields A and B:

A src	Packets from the IP address in field A matches. Field B is ignored.
A dst	Packets to the IP address in field A matches. Field B is ignored.
A any	Packets to or from the IP address in field A matches. Field B is ignored.
A to B	Packets from A to B matches.
B to A	Packets from B to A matches.
Between A&B	Packets from A to B, or from B to A, matches.
not this combination	Packets that do not match the given combination of A and B are shown in the log.

If you, for example, want to study all packets to or from 10.3.27.18, except those to the file server 10.3.27.2, you should fill in the form like this:



IP Address Selection (Help)

A: 10.3.27.18 □ not this address

B: 10.3.27.2 ☑ not this address

○ A src ○ A dst ○ A any

○ A to B ○ B to A ● Between A&B

□ not this combination

Protocol/Port Selection

You can limit the selection by specifying certain protocols.

All IP protocols

No restriction regarding protocols.

TCP/UDP

When selecting TCP or UDP, you can choose all packets or packets to certain ports only.

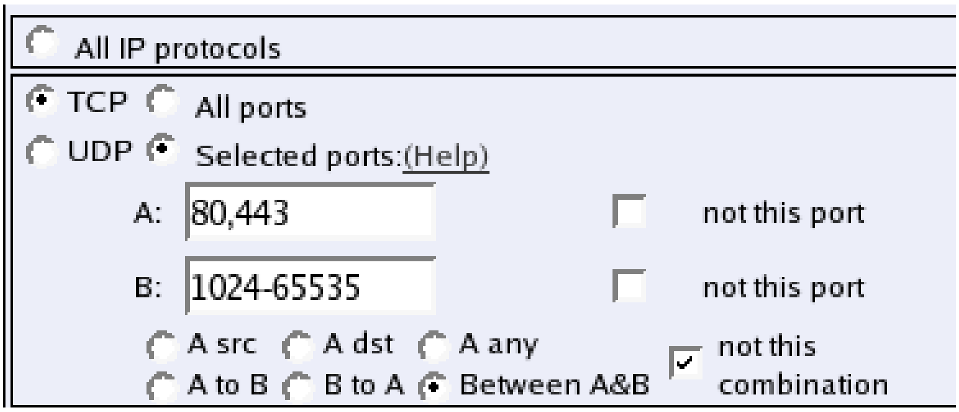
In these fields, you can enter a single port number (32), a range of port numbers (1-1023), a list of port numbers and ranges separated by commas (53, 1024-65535) or nothing at all. If the field is empty, any port will match. See appendix G, Lists of ports, ICMP and protocols, for more information on port numbers.

If you want to study all traffic except the one to or from a specific port or group of ports, enter the port number(s) here and mark the "not this port" box.

The selection can be modified by the control boxes under the fields A and B:

A src	Packets from the port number in field A matches. Field B is ignored.
A dst	Packets to the port number in field A matches. Field B is ignored.
A any	Packets to or from the port number in field A matches. Field B is ignored.
A to B	Packets from A to B matches.
B to A	Packets from B to A matches.
Between A&B	Packets from A to B, or from B to A, matches.
not this combination	Packets that do not match the given combination of A and B are shown in the log.

If you, for example, want to search for all packets to a web server, but not packets on the "normal" client and server ports in your environment, fill in the form like this:



○ All IP protocols

● TCP ○ All ports

○ UDP ● Selected ports: (Help)

A: 80,443 □ not this port

B: 1024-65535 □ not this port

○ A src ○ A dst ○ A any

○ A to B ○ B to A ● Between A&B

☑ not this combination

ICMP

ICMP packets contain a type field and a code field. When searching for ICMP packets, you can select all packets or only those matching certain criteria.

In the type and code fields, you can enter a single number (e. g., 5), a range of numbers (e. g., 5-10), a list of numbers and ranges, separated by commas (e. g., 5, 10-20) or nothing at all. If the field is empty, any type or code will match. See appendix G, Lists of ports, ICMP and protocols, for more information on ICMP types and codes.

If you want to study all traffic except the one of a certain type/code, enter the type/code number(s) here and mark the "not" box.

ESP

ESP is an authentication/encryption protocol. Select this if you want to search for encrypted packets.

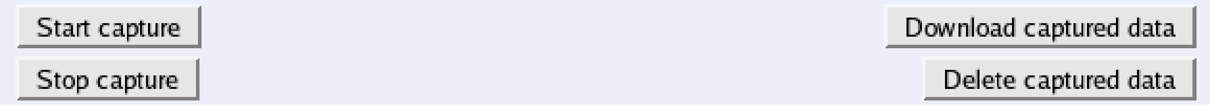
Note that you must have selected a log class which saves to local file, for encrypted packets, to be able to display them here.

Protocol number

Here, you enter the number(s) of the protocols you want to search for. You can enter a single number (e. g., 5), a range of numbers (e. g., 5-10), a list of numbers and ranges, separated by commas (e. g., 5, 10-20) or nothing at all. If the field is empty, any protocol will match. See appendix C, Lists of Reserved Ports, ICMP Types and Codes, and Internet Protocols, for more information on protocol numbers.

If you want to study all traffic except the one over a certain protocol or protocols, enter the protocol number(s) here and mark the "not" box.

Collect data



Below the selection boxes, you activate and deactivate the sniffer by pressing the **Start sniffing** and **Stop sniffing** buttons.

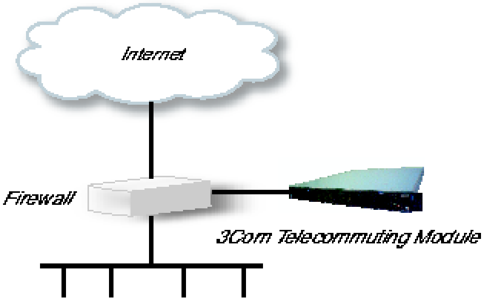
When the sniffer has been stopped, the capture log can be downloaded by pressing the **Download sniffer data** button. The captured data can be deleted by pressing the **Delete sniffer data** button.

Chapter 14. Firewall and Client Configuration

Additional configuration for the firewall and the SIP clients is required to make the Telecommuting Module work properly. The amount and nature of the configuration depends on which **Telecommuting Module Type** was selected.

The DMZ type

Using the DMZ type, the network configuration should look like this:



The Firewall

The firewall to which the Telecommuting Module is connected should have the following configuration:

SIP over UDP

- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (port 5060). You must allow traffic in both directions.
- Let through UDP traffic between the internal networks (all high ports) and the Telecommuting Module (port 5060). You must allow traffic in both directions.
- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the internal networks (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the Telecommuting Module (all high ports) and the Internet (port 53). You must allow traffic in both directions. This enables the Telecommuting Module to make DNS queries to DNS servers on the Internet. If the DNS server is located on the same network as the Telecommuting Module, you don't have to do this step.
- NAT between the Telecommuting Module and the Internet must not be used.
- NAT between the Telecommuting Module and the internal networks must not be used.

SIP over TCP/TLS

- Let through TCP traffic between the Internet (all high ports) and the Telecommuting Module (ports 1024-32767). You must allow traffic in both directions.
- Let through TCP traffic between the internal networks (all high ports) and the Telecommuting Module (ports 1024-32767). You must allow traffic in both directions.
- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the internal networks (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the Telecommuting Module (all high ports) and the Internet (port 53). You must allow traffic in both directions. This enables the Telecommuting Module to make DNS queries to DNS servers on the Internet. If the DNS server is located on the same network as the Telecommuting Module, you don't have to do this step.

- NAT between the Telecommuting Module and the Internet must not be used.
- NAT between the Telecommuting Module and the internal networks must not be used.

The SIP clients

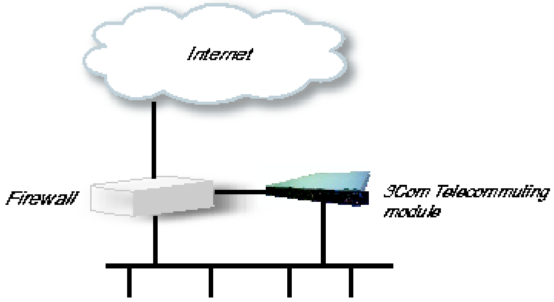
SIP clients will use the Telecommuting Module as their outgoing SIP proxy and as their registrar (if they can't be configured with the domain only). If you don't want to use the Telecommuting Module as the registrar, you should point the clients to the SIP registrar you want to use.

Other

The DNS server used must have a record for the SIP domain, which states that the Telecommuting Module handles the domain, or many SIP clients won't be able to use it (if you don't use plain IP addresses as domains).

The DMZ/LAN type

Using the DMZ/LAN type, the network configuration should look like this:



The Firewall

The firewall to which the Telecommuting Module is connected should have the following configuration:

SIP over UDP

- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (port 5060). You must allow traffic in both directions.
- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the Telecommuting Module (all high ports) and the Internet (port 53). You must allow traffic in both directions. This enables the Telecommuting Module to make DNS queries to DNS servers on the Internet. If the DNS server is located on the same network as the Telecommuting Module, you don't have to do this step.
- NAT between the Telecommuting Module and the Internet must not be used.

SIP over TCP/TLS

- Let through TCP traffic between the Internet (all high ports) and the Telecommuting Module (ports 1024-32767). You must allow traffic in both directions.
- Let through UDP traffic between the Internet (all high ports) and the Telecommuting Module (the port interval for media streams which was set on the **Basic** page). You must allow traffic in both directions.
- Let through UDP traffic between the Telecommuting Module (all high ports) and the Internet (port 53). You must allow traffic in both directions. This enables the Telecommuting Module to make DNS queries to DNS servers on the Internet. If the DNS server is located on the same network as the Telecommuting Module, you don't have to do this step.
- NAT between the Telecommuting Module and the Internet must not be used.

SIP clients

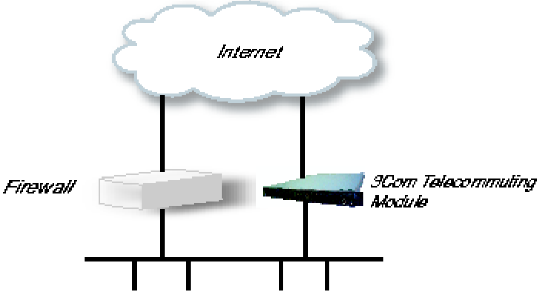
The SIP clients on the internal network should have the Telecommuting Module's IP address on that network as their outgoing SIP proxy and registrar.

Other

The DNS server used must have a record for the SIP domain, which states that the Telecommuting Module handles the domain, or many SIP clients won't be able to use it (if you don't use plain IP addresses as domains).

The Standalone type

Using the Standalone type, the network configuration should look like this:



The SIP clients

SIP clients will use the Telecommuting Module as their outgoing SIP proxy and as their registrar (if they can't be configured with the domain only). If you don't want to use the Telecommuting Module as the registrar, you should point the clients to the SIP registrar you want to use.

Other

The DNS server used must have a record for the SIP domain, which states that the Telecommuting Module handles the domain, or many SIP clients won't be able to use it (if you don't use plain IP addresses as domains).

Part IV. Appendices

In the appendices, you find more thorough information about Internet and computer security, such as descriptions of Internet services and lists of Internet protocols.

Appendix A. More About SIP

The SIP protocol

SIP (Session Initiation Protocol), defined in RFC 3261 (with various extensions), handles creation, modification and termination of various media stream sessions over an IP network. It is for example used for Internet telephone calls and distribution of video streams.

SIP also supports user mobility by allowing registration of a user and proxying or redirecting requests to the user's current location. This is performed by the user registering his presence at a machine with the central registrar. The SIP registrar keeps track of the user, but doesn't hold any information about which media streams the computers or clients can manage. This is negotiated between the parts when initiating a SIP session.

Why use SIP?

Today, two protocols for transmitting IP telephony exist; SIP and H.323. The H.323 protocol was originally designed for video conferences over ISDN and is a mix of several protocols and standards for performing the various phases of a connection. The SIP protocol was designed for general session initialization over the Internet.

Both protocols have the disadvantage (from a firewall point of view) of needing dynamically allocated ports for the data transmission, but today no protocol supports tunneling random media streams.

When comparing the two protocols, there is one major drawback to the H.323 protocol: its lack of scalability. H.323 is mostly used in small LANs. When extending to world-wide IP networks, SIP has many advantages:

Loop detection

> When trying to locate a user over several domains, loops can occur. H.323 has no support for loop detection, which can cause network overload.
>
> Loops are easily detected using SIP headers, as they specify all proxies that have handled the SIP packet.

Distributed control

> H.323 uses gatekeepers, which are devices used for handling call states and redirecting calls to aliases. As every call is carried out statefully, the gatekeepers must keep a call state during the entire call. This of course makes the gatekeepers a major bottleneck in the system.
>
> There is also a need for a central point when performing multi-user calls, which means that someone must provide this central point, and that this machine must be dimensioned for the size of the call.
>
> SIP sessions are completely distributed, making the need of these central points disappear.

Small connection overhead

> Establishing a connection using H.323 takes about three times the data and turnarounds compared to when using SIP.

Apart from this, there are some more disadvantages with H.323. As it uses many protocols, more ports need to be opened in a firewall to enable H.323 traffic through. SIP is a single protocol, which means that only one port has to be opened for SIP traffic. For both protocols, however, more ports must be opened for the data streams.

SIP runs on both TCP and UDP (and, in fact, can be extended to run on almost any transport protocol), making it possible to use UDP for large servers, thereby enabling stateless sessions. H.323 only runs on TCP, which as already stated loads the servers by requiring state management.

SIP and firewalls

When trying to use SIP through a firewall, there are some problems.

SIP initiates sessions of other protocols. This means that when a SIP session has been started, various other protocols are used as well, usually transmitted over TCP or UDP on some port. For a firewall, this is a problem, as it often opens up certain protocols and ports in advance, but now you don't know which ports to open. To handle SIP through a firewall which doesn't understand the SIP concept, all ports must be open all the time, which would make the firewall somewhat unnecessary. A firewall that understands SIP can open up the ports for the right protocols just when the SIP traffic needs it.

In the SIP headers there is a lot of information concerning what IP numbers the session participants use. This is a problem if a SIP session should be established through a firewall using NAT. The IP number on the hidden side (which appears in the SIP headers) won't be the same as the one that clients on the outside should use.

SIP sessions

Establishing a SIP session

You start a call (a session) by sending a request to the address of the person you want to communicate with. The format of the address is <sip:user@host>, where user can be a user name or a telephone number, and host can be a domain name (e.g. example.com) or a numerical network address (e.g. 172.15.253.12). This means that it usually looks a lot like a standard e-mail address. In this request information about which media streams the client wants to send/receive and what ports should be used is also included.

The SIP client sends this request to its default SIP proxy. This proxy resolves the SIP domain in DNS, and sends the request to the SIP registrar for that domain. The proxy also adds information stating that the request was routed through the proxy, thus ensuring that the reply will be routed the same way.

The registrar for the domain looks up the user to see where he is registered, and forwards the request to the machine in question. The SIP client on this machine alerts the user, indicating that someone wants to initiate a SIP session. The user confirms that he, too, wants the SIP session. The client sends a reply with necessary information about what ports should be used by this client for sending and receiving media streams.

The first client receives the reply and sends a confirmation packet. After this, the media streams can be sent.

Appendix B. Troubleshooting

Troubleshooting the Telecommuting Module largely consists of checking the hardware (the Telecommuting Module, the network connectors, ...) and checking the Telecommuting Module log. The log is usually an excellent tool in finding out why the Telecommuting Module does not do what you wanted it to do.

Below is some general advice to help you troubleshoot, almost regardless of which problem you have.

- Check that the events you look for are really logged (on the **Logging Configuration** page).
- Check that the configuration has been applied properly, either by applying it (on the **Save/Load Configuration** page) or by checking the Permanent Configuration (on the **Show Configuration** page).
- Check that you display the log you want to look for. The correct date and time (or no date or time) should be filled in, the desired log entries should be checked on the righthand side of the page, and the three boxes concerning which IP packets to show should be filled in accordingly.

Network troubleshooting

No traffic shown in the log

- Check that the interface is turned on on the corresponding interface page.
- Check that the Telecommuting Module has a correct default gateway (on the **Basic Configuration** page).
- Check that the client computer has a correct default gateway.

Traffic discarded as spoofed

When traffic is blocked and the reason given is Spoofed, there is a mismatch between the network that the Telecommuting Module is configured for and the network that the client is configured for. The Telecommuting Module regards an IP address as spoofed if it detects traffic from that IP address on an interface where the IP address should not be.

An example of a situation where this occurs is when you move a computer from one Telecommuting Module interface to another without changing its IP address and netmask.

SIP troubleshooting

Before going into the different error descriptions below, check that the SIP module is turned on and the configuration applied.

SIP users can’t register on the Telecommuting Module

- Check that the SIP domain that the users try to register on is listed in the **Local SIP Domains** table.
- If you do not use RADIUS authentication, check that the SIP user which tries to register is listed in the **Local SIP User Database** table.
- If you do not use RADIUS authentication, check in the **Local SIP User Database** table that the SIP user which tries to register is allowed to register from the network where the SIP client is located.
- If local SIP authentication is used, check that the SIP user uses the correct password.

SIP users can’t register through the Telecommuting Module

- Check that the SIP domain that the users try to register on is not listed in the **Local SIP Domains** table.
- Check that SIP authentication is not used. If you want the Telecommuting Module to perform SIP authentication, make sure that the Telecommuting Module and the SIP registrar uses the same SIP realm.
- If the client sends the REGISTER request to the Telecommuting Module itself and the Telecommuting Module is supposed to redirect it to the registrar, check on the **Routing** page that this is configured correctly.

- Check that the (on the **Logging Configuration** page).

A call is established, but there is no voice

- If you use a DMZ Telecommuting Module Type, check on the **Surroundings** page that you have separated the clients into correct networks. Clients that can reach each other without using the Telecommuting Module should be in the same Surroundings network, and clients that must use the Telecommuting Module to reach each other should be in different Surroundings networks.
- If you use a DMZ or DMZ/LAN Telecommuting Module Type, check that the firewall connected to the Telecommuting Module does not block the media. See chapter 14, Firewall and Client Configuration, for more information about which ports should be opened in the firewall.

VPN troubleshooting

No IPsec tunnel established

- Check that VPN negotiation packets (UDP port 500) reach the Telecommuting Module. The other end could be located behind a NATing device which changes the sender port.
- Check that packets from the other end can reach the Telecommuting Module and vice versa. A failure to do so could indicate a faulty routing somewhere between the two VPN units or that some blocking device is located between them.
- Check that the VPN negotiation packets to the Telecommuting Module are addressed to the correct IP address (the one selected on the **IPsec Peers** page.
- If preshared secrets are used, check that both units share the same secret. If certificates are used, check that the right certificates are used.
- If the unit in the other end is no 3Com VCX IP Telecommuting Module, make sure that it uses PFS (Perfect Forward Secrecy). 3Com VCX IP Telecommuting Module always uses PFS.
- If the unit in the other end is no 3Com VCX IP Telecommuting Module, make sure that it uses 3DES or AES. 3Com VCX IP Telecommuting Module accepts both encryption algorithms.
- Check that the networks to use the VPN tunnel are the same on both VPN units.

IPsec tunnel established, no traffic

- Check that the networks, between which the traffic should be sent, are allowed to use the IPsec tunnel.
- Check that there is a rule to let this traffic through. Check that the rule uses a proper network, service, IPsec peer and time class.

IPsec tunnel established, no traffic after some time

- Check that the key lifetime for the ISAKMP key is the same for both VPN units.
- Check that the key lifetime for the IPsec key is the same for both VPN units.

Administration troubleshooting

This section describes problems that can arise when administrating the Telecommuting Module.

The Telecommuting Module reverts to the old version when trying to upgrade

- Check the release note for new error checks, which will make some part of your configuration invalid with the new software version.

The Telecommuting Module is unaccessible for some time when trying to apply a configuration

There is something in the new configuration that does not allow you to access the web configuration interface.

- Check the log to see if your access attempts reached the Telecommuting Module.
- Check that the configuration IP address (**Configuration Transport** on the **Access Control** page) is the one you use when trying to access the Telecommuting Module. Note that if you apply a configuration which changes the configuration IP address, your web browser will not automatically be redirected to the new IP address.
- Check that configuration traffic is allowed via the interface your web browser is located behind (**Configuration Allowed Via Interface** on the **Access Control** page).
- Check that configuration traffic is allowed from the computer where you run your web browser (**Configuration Computers** on the **Access Control** page).

Appendix C. Lists of Reserved Ports, ICMP Types and Codes, and Internet Protocols

The following lists discuss the most important ports and the server services that belong to them, and the different types of ICMP messages. Client programs usually use ports between 1024 and 65535.

There are also lists over Internet protocols, reserved IP addresses and a mapping between netmasks and IP address intervals.

List of the most important reserved ports

This is a list of important ports. See /etc/services and http://www.iana.org/.

Name	Port/protocol	Description
echo	7/tcp	
echo	7/udp	
discard	9/tcp	sink null
discard	9/udp	sink null
systat	11/tcp	users
daytime	13/tcp	
daytime	13/udp	
netstat	15/tcp	
qotd	17/tcp	quote
chargen	19/tcp	ttytst source
chargen	19/udp	ttytst source
ftp-data	20/tcp	ftp data transfer
ftp	21/tcp	ftp command
ssh	22/tcp	Secure Shell
telnet	23/tcp	
smtp	25/tcp	mail
time	37/tcp	timeserver
time	37/udp	timeserver
rlp	39/udp	resource location
nicname	43/tcp	who is
domain	53/tcp	domain name server
domain	53/udp	domain name server
sql*net	66/tcp	Oracle SQL*net
sql*net	66/udp	Oracle SQL*net
bootps	67/tcp	bootp server
bootps	67/udp	bootp server
bootpc	68/tcp	bootp client
bootpc	68/udp	bootp client
tftp	69/tcp	Trivial File Transfer
tftp	69/udp	Trivial File Transfer
gopher	70/tcp	gopher server
finger	79/tcp	Finger
www-http	80/tcp	WWW

Name	Port/protocol	Description
www-http	80/udp	WWW
kerberos	88/tcp	Kerberos
kerberos	88/udp	Kerberos
pop2	109/tcp	PostOffice V.2
pop3	110/tcp	PostOffice V.3
sunrpc	111/tcp	RPC 4.0 portmapper
sunrpc	111/udp	RPC 4.0 portmapper
auth/ident	113/tcp	Authentication Service
auth	113/udp	Authentication Service
audionews	114/tcp	Audio News Multicast
audionews	114/udp	Audio News Multicast
nntp	119/tcp	Usenet Network News Transfer
nntp	119/udp	Usenet Network News Transfer
ntp	123/tcp	Network Time Protocol
ntp	123/udp	Network Time Protocol
netbios-ns	137/tcp	NETBIOS Name Service
netbios-ns	137/udp	NETBIOS Name Service
netbios-dgm	138/tcp	NETBIOS Datagram Service
netbios-dgm	138/udp	NETBIOS Datagram Service
netbios-ssn	139/tcp	NETBIOS Session Service
netbios-ssn	139/udp	NETBIOS Session Service
imap	143/tcp	Internet Message Access Protocol
imap	143/udp	Internet Message Access Protocol
sql-net	150/tcp	SQL-NET
sql-net	150/udp	SQL-NET
sqlsrv	156/tcp	SQL Service
sqlsrv	156/udp	SQL Service
snmp	161/tcp	
snmp	161/udp	
snmp-trap	162/tcp	
snmp-trap	162/udp	
cmip-man	163/tcp	CMIP/TCP Manager
cmip-man	163/udp	CMIP
cmip-agent	164/tcp	CMIP/TCP Agent
cmip-agent	164/udp	CMIP
irc	194/tcp	Internet Relay Chat
irc	194/udp	Internet Relay Chat
at-rtmp	201/tcp	AppleTalk Routing Maintenance
at-rtmp	201/udp	AppleTalk Routing Maintenance
at-nbp	202/tcp	AppleTalk Name Binding
at-nbp	202/udp	AppleTalk Name Binding
at-3	203/tcp	AppleTalk
at-3	203/udp	AppleTalk
at-echo	204/tcp	AppleTalk Echo

Name	Port/protocol	Description
at-echo	204/udp	AppleTalk Echo
at-5	205/tcp	AppleTalk
at-5	205/udp	AppleTalk
at-zis	206/tcp	AppleTalk Zone Information
at-zis	206/udp	AppleTalk Zone Information
at-7	207/tcp	AppleTalk
at-7	207/udp	AppleTalk
at-8	208/tcp	AppleTalk
at-8	208/udp	AppleTalk
ipx	213/tcp	
ipx	213/udp	
imap3	220/tcp	Interactive Mail Access Protocol v3
imap3	220/udp	Interactive Mail Access Protocol v3
aurp	387/tcp	AppleTalk Update-Based Routing
aurp	387/udp	AppleTalk Update-Based Routing
netware-ip	396/tcp	Novell Netware over IP
netware-ip	396/udp	Novell Netware over IP
rmt	411/tcp	Remote mt
rmt	411/udp	Remote mt
microsoft-ds	445/tcp	
microsoft-ds	445/udp	
isakmp	500/udp	ISAKMP/IKE
fcp	510/tcp	First Class Server
exec	512/tcp	BSD rexecd(8)
comsat/biff	512/udp	used by mail system to notify users
login	513/tcp	BSD rlogind(8)
who	513/udp	whod BSD rwhod(8)
shell	514/tcp	cmd BSD rshd(8)
syslog	514/udp	BSD syslogd(8)
printer	515/tcp	spooler BSD lpd(8)
printer	515/udp	Printer Spooler
talk	517/tcp	BSD talkd(8)
talk	517/udp	talk
ntalk	518/udp	New Talk (ntalk)
ntalk	518/udp	SunOS talkd(8)
netnews	532/tcp	readnews
uucp	540/tcp	uucpd BSD uucpd(8)
uucp	540/udp	uucpd BSD uucpd(8)
klogin	543/tcp	Kerberos Login
klogin	543/udp	Kerberos Login
kshell	544/tcp	Kerberos Shell
kshell	544/udp	Kerberos Shell
ekshell	545/tcp	krcmd Kerberos encrypted remote shell -kfall
pcserver	600/tcp	ECD Integrated PC board srvr

Name	Port/protocol	Description
mount	635/udp	NFS Mount Service
pcnfs	640/udp	PC-NFS DOS Authentication
bwnfs	650/udp	BW-NFS DOS Authentication
flexlm	744/tcp	Flexible License Manager
flexlm	744/udp	Flexible License Manager
kerberos-adm	749/tcp	Kerberos Administration
kerberos-adm	749/udp	Kerberos Administration
kerberos	750/tcp	kdc Kerberos authentication--tcp
kerberos	750/udp	Kerberos
kerberos_master	751/udp	Kerberos authentication
kerberos_master	751/tcp	Kerberos authentication
krb_prop	754/tcp	Kerberos slave propagation
	999/udp	Applixware
socks	1080/tcp	
socks	1080/udp	
kpop	1109/tcp	Pop with Kerberos
ms-sql-s	1433/tcp	Microsoft SQL Server
ms-sql-s	1433/udp	Microsoft SQL Server
ms-sql-m	1434/tcp	Microsoft SQL Monitor
ms-sql-m	1434/udp	Microsoft SQL Monitor
pptp	1723/tcp	pptp
pptp	1723/udp	pptp
nfs	2049/tcp	Network File System
nfs	2049/udp	Network File System
eklogin	2105/tcp	Kerberos encrypted rlogin
rkinit	2108/tcp	Kerberos remote kinit
kx	2111/tcp	X over Kerberos
kauth	2120/tcp	Remote kauth
lyskom	4894/tcp	LysKOM (conference system)
sip	5060/tcp	Session Initiation Protocol
sip	5060/udp	Session Initiation Protocol
x11	6000-6063/tcp	X Window System
x11	6000-6063/udp	X Window System
irc	6667/tcp	Internet Relay Chat
afs	7000-7009/tcp	
afs	7000-7009/udp	

List of ICMP types

The following list is taken from http://www.iana.org/, ICMP Parameters.

Type	Name	Reference
0	Echo Reply	[RFC792]
1	Unassigned	[JBP]
2	Unassigned	[JBP]

Type	Name	Reference
3	Destination Unreachable	[RFC792]
4	Source Quench	[RFC792]
5	Redirect	[RFC792]
6	Alternate Host Address	[JBP]
7	Unassigned	[JBP]
8	Echo	[RFC792]
9	Router Advertisement	[RFC1256]
10	Router Solicitation	[RFC1256]
11	Time Exceeded	[RFC792]
12	Parameter Problem	[RFC792]
13	Timestamp	[RFC792]
14	Timestamp Reply	[RFC792]
15	Information Request	[RFC792]
16	Information Reply	[RFC792]
17	Address Mask Request	[RFC950]
18	Address Mask Reply	[RFC950]
19	Reserved (for Security)	[Solo]
20-29	Reserved (for Robustness Experiment)	[ZSu]
30	Traceroute	[RFC1393]
31	Datagram Conversion Error	[RFC1475]
32	Mobile Host Redirect	[David Johnson]
33	IPv6 Where-Are-You	[Bill Simpson]
34	IPv6 I-Am-Here	[Bill Simpson]
35	Mobile Registration Request	[Bill Simpson]
36	Mobile Registration Reply	[Bill Simpson]
37	Domain Name Request	[Simpson]
38	Domain Name Reply	[Simpson]
39	SKIP	[Markson]
40	Photuris	[RFC2521]
41-255	Reserved	[JBP]

ICMP codes

Some ICMP types have codes attached.

ICMP type	Name	Code	Description
0	Echo Reply	0	No Code
1	Unassigned		
2	Unassigned		
3	Destination Unreachable	0	Net Unreachable
		1	Host Unreachable
		2	Protocol Unreachable
		3	Port Unreachable
		4	Fragmentation Needed and Don’t Fragment was Set

ICMP type	Name	Code	Description
		5	Source Route Failed
		6	Destination Network Unknown
		7	Destination Host Unknown
		8	Source Host Isolated
		9	Communication with Destination Network is Administratively Prohibited
		10	Communication with Destination Host is Administratively Prohibited
		11	Destination Network Unreachable for Type of Service
		12	Destination Host Unreachable for Type of Service
4	Source Quench	0	No Code
5	Redirect	0	Redirect Datagram for the Network (or subnet)
		1	Redirect Datagram for the Host
		2	Redirect Datagram for the Type of Service and Network
		3	Redirect Datagram for the Type of Service and Host
6	Alternate Host Address	0	Alternate Address for Host
7	Unassigned		
8	Echo	0	No Code
9	Router Advertisement	0	No Code
10	Router Selection	0	No Code
11	Time Exceeded	0	Time to Live exceeded in Transit
		1	Fragment Reassembly Time Exceeded
12	Parameter Problem	0	Pointer indicates the error
		1	Missing a Required Option
		2	Bad Length
13	Timestamp	0	No Code
14	Timestamp Reply	0	No Code
15	Information Request	0	No Code
16	Information Reply	0	No Code
17	Address Mask Request	0	No Code
18	Address Mask Reply	0	No Code
19	Reserved (for Security)		
20-29	Reserved (for Robustness Experiment)		
30	Traceroute		
31	Datagram Conversion Error		
32	Mobile Host Redirect		
33	IPv6 Where-Are-You		
34	IPv6 I-Am-Here		

ICMP type	Name	Code	Description
35	Mobile Registration Request		
36	Mobile Registration Reply		

Internet protocols and their numbers

The following table lists common Internet protocols and their protocol numbers. All these protocols run on IP. The list is extracted from http://www.iana.org/, Protocol Numbers.

Protocol number	Keyword	Protocol
0	HOPOPT	IPv6 Hop-by-Hop Option
1	ICMP	Internet Control Message
2	IGMP	Internet Group Management
3	GGP	Gateway-to-Gateway
4	IP	IP in IP (encapsulation)
5	ST	Stream
6	TCP	Transmission Control Protocol
8	EGP	Exterior Gateway Protocol
9	IGP	any private interior gateway
10	BBN-RCC-MON	BBN RCC Monitoring
11	NVP-II	Network Voice Protocol
17	UDP	User Datagram
18	MUX	Multiplexing
19	DCN-MEAS	DCN Measurement Subsystems
20	HMP	Host Monitoring
21	PRM	Packet Radio Measurement
22	XNS-IDP	XEROX NS IDP
27	RDP	Reliable Data Protocol
28	IRTP	Internet Reliable Transaction
29	ISO-TP4	ISO Transport Protocol Class 4
30	NETBLT	Bulk Data Transfer Protocol
31	MFE-NSP	MFE Network Services Protocol
32	MERIT-INP	MERIT Internodal Protocol
34	3PC	Third Party Connect Protocol
37	DDP	Datagram Delivery Protocol
39	TP++	TP++ Transport Protocol
40	IL	IL Transport Protocol
46	RSVP	Reservation Protocol
47	GRE	General Routing Encapsulation
48	MHRP	Mobile Host Routing Protocol
50	ESP	Encapsulation Security Payload
51	AH	Authentication Header
53	SWIPE	IP with Encryption
54	NHRP	NBMA Next Hop Resolution Protocol
61		any host internal protocol
63		any local network

Protocol number	Keyword	Protocol
64	SAT-EXPAK	SATNET and Backroom EXPAK
65	KRYPTOLAN	Kryptolan
66	RVD	MIT Remote Virtual Disk Protocol
68		any distributed file system
69	SAT-MON	SATNET Monitoring
70	VISA	VISA Protocol
75	PVP	Packet Video Protocol
80	ISO-IP	ISO Internet Protocol
84	TTP	TTP
85	NSFNET-IGP	NSFNET-IGP
86	DGP	Dissimilar Gateway Protocol
87	TCF	TCF
88	EIGRP	EIGRP
91	LARP	Locus Address Resolution Protocol
92	MTP	Multicast Transport Protocol
93	AX.25	AX.25 Frames
94	IPIP	IP-within-IP Encapsulation Protocol
95	MICP	Mobile Internetworking Control Pro.
97	ETHERIP	Ethernet-within-IP Encapsulation
98	ENCAP	Encapsulation Header
99		any private encryption scheme
100	GMTP	GMTP
115	L2TP	Layer Two Tunneling Protocol
255		Reserved

IP intervals

This is a list of the IP addresses available for different netmasks. The first column shows the number of bits used for the net address, i. e., is set to 1 in the netmask. The second column maps the number of bits to a netmask on the usual octet-dot format. The third column shows the address class for this netmask.

The second table shows the IP address interval for each class.

1-set bits	Mask	IP address class
0	0.0.0.0	0
1	128.0.0.0	1
2	192.0.0.0	2
3	224.0.0.0	3
4	240.0.0.0	4
5	248.0.0.0	5
6	252.0.0.0	6
7	254.0.0.0	7
8	255.0.0.0	0
9	255.128.0.0	1
10	255.192.0.0	2
11	255.224.0.0	3
12	255.240.0.0	4

1-set bits	Mask	IP address class
13	255.248.0.0	5
14	255.252.0.0	6
15	255.254.0.0	7
16	255.255.0.0	0
17	255.255.128.0	1
18	255.255.192.0	2
19	255.255.224.0	3
20	255.255.240.0	4
21	255.255.248.0	5
22	255.255.252.0	6
23	255.255.254.0	7
24	255.255.255.0	0
25	255.255.255.128	1
26	255.255.255.192	2
27	255.255.255.224	3
28	255.255.255.240	4
29	255.255.255.248	5
30	255.255.255.252	6
31	255.255.255.254	7
32	255.255.255.255	8

Example: We want to split the network 130.234.250.0/25 (i.e., 130.234.250.0-130.234.250.127) into four subnets. The netmask for each subnet will be 27 bits, which means 255.255.255.224. This netmask is in IP class 3. The second table gives us the following available intervals: 0-31, 32-63, 64-95, and 96-127 (then we are out of IP addresses). One of the subnets will be 130.234.250.64/27 (130.234.250.64-130.234.250.95).

Class	IP intervals							
0	0-255							
1	0-127	128-255						
2	0-63	64-127	128-191	192-255				
3	0-31	32-63	64-95	96-127	128-159	160-191	192-223	224-255
4	0-15	16-31	32-47	48-63	64-79	80-95	96-111	112-127
	128-143	144-159	160-175	176-191	192-207	208-223	224-239	240-255
5	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
	64-71	72-79	80-87	88-95	96-103	104-111	112-119	120-127
	128-135	136-143	144-151	152-159	160-167	168-175	176-183	184-191
	192-199	200-207	208-215	216-223	224-231	232-239	240-247	248-255
6	0-3	4-7	8-11	12-15	16-19	20-23	24-27	28-31
	32-35	36-39	40-43	44-47	48-51	52-55	56-59	60-63
	64-67	68-71	72-75	76-79	80-83	84-87	88-91	92-95
	96-99	100-103	104-107	108-111	112-115	116-119	120-123	124-127
	128-131	132-135	136-139	140-143	144-147	148-151	152-155	156-159
	160-163	164-167	168-171	172-175	176-179	180-183	184-187	188-191
	192-195	196-199	200-203	204-207	208-211	212-215	216-219	220-223
	224-227	228-231	232-235	236-239	240-243	244-247	248-251	252-255

Class	IP intervals							
7	0-1	2-3	4-5	6-7	8-9	10-11	...	254-255
8	0	1	2	3	4	5	...	255

You could have a large network, for example 130.234.128.0/18, which is interpreted from the tables as all IP addresses from 130.234.128.0 to 130.234.191.255, inclusive (18 is in class no. 2, giving an IP interval of 128-191). N.B.: The netmask only reaches the third byte, which means that all IP addresses in byte 4 are available.

Reserved IP addresses

The Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of the IP address space for private internets (see also RFC 1918):

- 10.0.0.0 - 10.255.255.255 (10/8)
- 172.16.0.0 - 172.31.255.255 (172.16/12)
- 192.168.0.0 - 192.168.255.255 (192.168/16)

Appendix D. Definitions of terms

AFS, Andrew File System

AFS is a more secure way of distributing file systems over a network. If files are mounted over the Internet, AFS is fairly secure. Normally, AFS uses Kerberos for security management.

ARP

ARP, Address Resolution Protocol, is a protocol for mapping an IP address to a physical machine address in the local network. A thorough description of ARP can be found in RFC 826.

Client program

A client program is one that the user runs on her computer. A client program connects to a server. One example of a client program is Netscape (a WWW client). One benefit of dividing up a service into server and client programs is that the server program can be run on a larger computer with better resources, and the users do not have to make their own copies of the databases. This allows the client programs to be run on less powerful computers.

Cracker

A person who breaks into computer systems and commits other criminal acts using a computer.

Daemon program

A daemon program is a server program for a service. This kind of program waits for and manages external calls. A typical example is FTP. A user starts his FTP client. The client connects to the FTP server. Now the user can transfer files to his own computer or to the server. See Server.

Denial of Service, DoS

A type of attack that tries to block a network service by overloading the server.

DHCP

DHCP, Dynamic Host Configuration Protocol, is a protocol for handing out IP addresses and other configuration information to computers without having to log on to every single machine. Instead, the computers themselves send out requests about this information at boot, and gets appropriate configuration parameters from a DHCP server. A thorough description of DHCP can be found in RFC 2131.

DMZ

A DMZ is a computer network that is accessible from two other computer networks that have no direct contact with each other. Often, one of these networks is the Internet and the other is a local, internal network. There is no direct connection between the Internet and the local network, but both of them can access an intermediate network, a demilitarized zone.

DMZs are often used for special servers, such as web servers, which must be accessible from two separate networks.

DNS

Domain Name System; see Name servers.

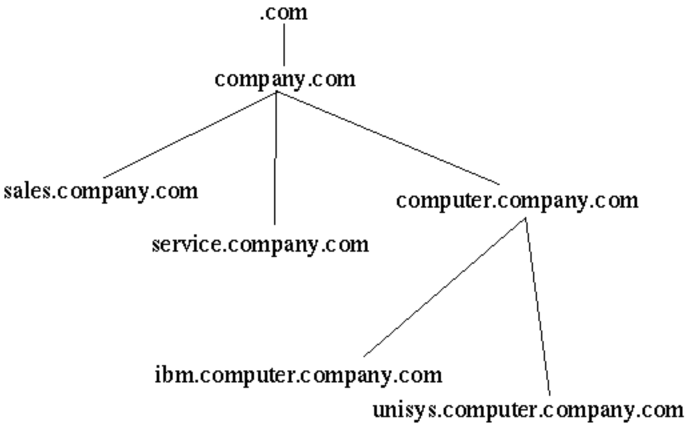
Domain

A domain is a country, organization, or subdivision. All countries have one top domain for the country, except for the USA, which is divided into a commercial domain (*.com*), a non-profit organizational domain (*.org*), a university domain (*.edu*), a military domain (*.mil*), a governmental domain (*.gov*), and a network domain (*.net*). All domains are hierarchical and each domain is responsible for the domains directly under it.

A domain can have several sub-domains, which in turn can have sub-domains and so on. The structure combines the domain name of the organization with the overlying domain name.

For example, Stanford University has the domain name stanford, which is under the university domain of USA, .edu; together they form the domain stanford.edu. The university also has different departments under stanford.edu.

The departments of a company or organization can request a sub-domain from the domain manager. So if the technicians in the company's service division want their own domain, they can go to their domain manager and request a domain called, for instance, service. Below, we have ‘Company Inc.,’ which consists of three departments: A sales department, a service department, and a computer department. The computer department is divided into an IBM section and a Unisys section.



Contact your internet service provider to register a domain.

Dynamic routing

Dynamic routing is used when the traffic between two computers have several routes available. The route for the packets can be changed if a connection is broken or a router is turned off. RIP is a protocol handling dynamic routing.

Firewall

A device that prevents unauthorized access to a computer network.

Forwarding

See Relay.

FTP (File Transfer Protocol)

Imagine that you have an account on a UNIX machine. You can retrieve and store files on the UNIX machine with FTP. The program that manages this is called the *FTP server*. You can also establish an area of files that are accessible to others. Anyone can log in as user anonymous and enter his e-mail address as a password. They can then access all files in this area, but nothing else. A computer with an FTP server and a freely available area is usually called an *FTP site*.

Gateway

Gateway is an old name for a Router.

Hacker

A person who is skilled and knowledgeable about computers and likes to examine the details of a computer system and what can be done with it. A hacker is good at programming and achieves good results. A hacker is not to be confused with a computer criminal; see Cracker.

HTTPS

HTTPS is WWW traffic (HTTP traffic) on an encrypted connection. The encrypted connection is established with the SSL protocol.

ICMP protocol

ICMP is used to forward information, primarily error messages. To see if a computer is running, the ‘ping’ program sends an echo request, which is part of ICMP. If a problem occurs with a connection, a response is sent through ICMP that something is not right (the computer is not responding, the network is down, etc). If there are two possible paths for a connection, a router along the way may tell the computer to use the other path. The router sends an ICMP redirect. ICMP uses the IP protocol to send data over the network.

IP address

IP addresses are the Internet equivalent to telephone numbers. An IP address is divided into four groups, each of which is a number from 0 to 255. The groups are separated by dots. An example of an IP address is

192.165.122.42. Several IP addresses are required to connect several computers in a network; one for each computer.

IP addresses were previously divided into A networks, B networks and C networks, but that terminology is now considered obsolete. An A network was one where the first group of numbers is predetermined and you determine the remaining groups yourself; for example 17.x.y.z . A B network was one where the two first groups are predetermined; for example 128.42.y.z. A C network was one where the first three groups are predetermined; for example 192.168.12.z .

IP

IP stands for Internet Protocol. This is a protocol that is used to send data between two computers on the same or different networks. IP performs no security checks. It works analogous to standard mail. Peter sends four postcards to Christy from the other side of the world. Christy gets postcard two first, then postcard one and postcard four. Postcard three disappears on the way. Peter and Christy know each other’s addresses, and the post office knows how to read addresses and send postcards in the right direction. But Peter and Christy cannot know if all of their postcards will arrive. And Christy doesn’t know what order the postcards were sent in.

For more information about IP addresses, see IP address.

Kerberos

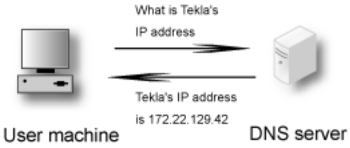
Kerberos is a system to secure connections between several computers over networks. The Kerberos system uses a Kerberos server to manage security. Connections that go through Kerberos are often encrypted.

Masquerading

See NAT.

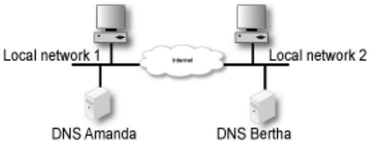
Name server, DNS

A DNS server is the Internet equivalent of dialing telephone information. If you know the name of a computer, you can access its IP address and vice versa. The server keeps track of names and IP addresses. Imagine that a user wants to connect to the computer "Tekla" through a Telnet (terminal) connection. The Telnet program asks the name server about Tekla and receives Tekla’s IP address. If the name server does not know a name, it asks the nearest name server. See the figure.



Name servers are usually named *primary*, *secondary*, or *other*. If you have several networks with several name servers, they can communicate with each other. It is a good idea to make them secondary name servers to each other. Secondary name servers work as extra name servers if the primary server is not working.

A secondary name server updates its information from the primary name server at regular intervals. You can specify how often. Only the manager of the name server can set it up as a secondary name server for someone else. In the figure below, we have two local networks with separate name servers. If name server Amanda does not work, a machine in network 1 may ask the name server in network 2, Bertha, if this server is set up as secondary name server for Amanda. Other name servers outside network 1 and 2 belong to the *other* category.



The name server responds to name queries on port 53. Both TCP and UDP is used for name queries.

NAT

NAT (Network Address Translation), also known as masquerading, is a way to hide a network from outside computers. Used with firewalls to hide the computers on the internal network from the rest of the world.

Netmask

See network mask.

Network mask

A network mask tells what computers can be accessed locally without using a gateway, and what computers can only be reached through a gateway. The bits in the network mask determine what is a network and what is a computer. The total number of bits is 32 and the "one-bits" are for networks. The network mask can be specified as the number of one-bits grouped in the same way as IP addresses. For what formerly was called a class C network, the network mask is 24, which can also be expressed as 255.255.255.0 (i.e., 24 one-bits grouped in octets and then interpreted as binary numbers). If this network is divided into several parts, the network mask is different, depending on how the division is done. For example, the network mask 255.255.255.224 gives a network with 32 IP addresses in it. See also the table of network masks in appendix C, Lists of Reserved Ports, ICMP Types and Codes, and Internet Protocols.

News

News is a distributed, loose conference system, which includes the entire Internet and more. News originated in e-mail, so it has many similarities to e-mail. It can also be called Usenet News and NetNews.

News is a conference system for exchange of ideas, questions and answers, and so on, just like in a BBS or COM system. What is written in News is not stored on a central computer; it is sent out all over the world and stored in several places. Your organization may choose to retrieve News and store all texts locally.

To keep track of everything, News is divided into news groups. A news group focuses on a specific area of interest. Each news group can have divisions and subgroups.

rec.motorcycles.harley is an example of a group name. rec is the main group, Recreational, which includes hobbies, recreation and the arts. A subgroup of rec is motorcycles, which is solely about motorcycles. A subgroup of rec.motorcycles is harley, which is only about Harley Davidson motorcycles. Another example is sci.geo.geology. Anyone can post articles to News; remember that several million people may be reading what you write. Make sure that all users are aware of this and are restrictive of what they write.

News servers use the NNTP protocol to communicate with each other. Many client programs also use NNTP to communicate with the news server. NNTP communication uses port 119.

NFS, Network File System

NFS is a protocol for mounting disks from other computers over the network. NFS should be blocked against unsecure external networks. NFS uses port 2049.

NIS/YP, Network Information Service/Yellow Pages®

NIS/YP is used to distribute central information to client machines in a network. Passwords and e-mail aliases are typical examples of such information. This also often used to allow users to sit at any work station, log in as themselves, and access their user accounts. NIS/YP should be blocked against unsecure external networks.

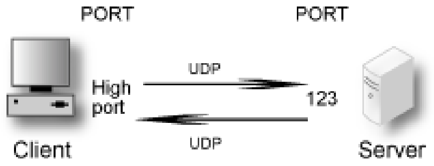
NNTP

See News.

NTP

NTP stands for Network Time Protocol and is used for synchronizing computer clocks. The synchronization normally uses a computer with a very accurate clock, e. g., a computer with an atomic clock.

A client computer wanting to synchronize with a server via NTP usually uses a high port on the client, port 123 on the server and the UDP protocol. The server returns data using UDP from port 123 to a high port on the client computer.



Two NTP servers communicating with each other use port 123 and the UDP protocol.

Open Windows

Open Windows is a window system that is used by several work stations. A similar window system is the X Window System, which Open Windows is based on. The X Window System and Open Windows use ports 6000 and upward for traffic to the work stations. It is a good idea to block ports 6000-6010 for incoming traffic from an unsecure outside network.

Packet

When something is sent over a computer network, for example, a file or an e-mail, it is divided up into sections. These sections are called packets. They make up a sort of jigsaw puzzle, each piece sent individually. The receiving computer has to reassemble the pieces.

Ping

Ping is used to examine whether a computer works and is accessible over a network. Ping sends ICMP traffic to the computer in question, and the target computer replies with a reply ICMP packet if it is running and reachable from the network.

You can also ping a whole network, and thereby use ping to examine which computers exist on a certain network. Therefore it is not advisable to allow ping into an internal network.

The client computer sends a type 8 ICMP packet, echo-request, to find out whether the target computer is working and accessible. The target computer ("server" in the picture below) replies with a type 0 ICMP packet, echo-reply, to tell it is working and accessible over the network.

Ports

When two computers are connected, ports are used. A client machine that wants access to a certain service on a server connects to the standard port for that particular service on the server. The programs on the client machine receive an available port over 1023. For example, if a user on the computer Tekla wants to run a Telnet session to the computer Winona, the user’s Telnet client program receives an available port over 1023 to connect to port 23 on Winona. If two server programs contact each other, one can act as a client program, receiving an available port over 1023 on its local machine. However, many server programs have special definitions of how servers communicate with each other, where both servers user their standard port.

PPP

PPP stands for Point-to-Point Protocol. This is usually used to send IP packets over modem connections. See also IP.

Protocols

Protocols are sets of rules for how programs communicate with each other. For example, a web server can use the protocols HTTP and HTTPS.

Proxy

Proxies are devices through which web pages, FTP files, and so on can be retrieved for a local network. This can be good to combine with a cache memory, which will store pages and files once fetched from the Internet site. When another user wants to look at a page already in the cache, it acts as a web server, sending the cached page instead of fetching a new copy through the Internet.

In your web client, specify a computer and cache/proxy to be used to store this information.

Relay

When the local network is connected to the Internet through a firewall, all types of services are usually blocked. It is as if the network is not connected to the Internet. Relays can then be set up to allow certain services, such as the WWW, to pass through under controlled circumstances. Think of it as a giant stone wall with a gate and a specialized gate keeper. The gate keeper only lets certain visitors pass. To allow others to pass through, you set up another gate with another specialized gate keeper.

RFC

An RFC (Request For Comments) is a document which standardizes some aspect of the Internet traffic. RFC:s are available at http://www.rfc-editor.org/rfcsearch.html.

RIP

RIP is a protocol that manages dynamic routing. Dynamic routing means that the path for traffic can be changed. RIP selects the path that goes through the least number of routers, but does not consider the bandwidth or load on the network. RIP is only used in local networks. Fixed paths for traffic are called static routing.

Router

A router is a machine that is used to connect several smaller and larger networks. Often, a router is used to connect a local network to the Internet. This router only lets traffic to the Internet out; all other traffic remains on the local network. A router can also be called a gateway.

Routing

A routing is a path for the traffic between different computers.

Server

A server can be a program that performs a service on a network or a computer that runs one or more server programs. One example is a computer that stores files centrally, which makes it a kind of server, usually called a *file server*. The program that manages traffic so that people from the outside can access an organization’s web pages is a *server program*.

SIP

SIP, Session Initiation Protocol, is a protocol for creating, maintaining and terminating various media stream sessions over an IP network. SIP is used to negotiate which media streams the parts can send and receive, and which parts should be involved in the exchange. When this is established, the media streams are sent according to their own protocols (e.g. HTTP). A thorough description of SIP can be found in RFC 2543.

SLIP

SLIP stands for Serial Line IP. This is usually used to send IP packets over modem connections. See IP.

SLIRP

SLIRP is a program that sends IP packets over serial connections, such a modem connections. SLIRP is run as a user program. SLIRP does not need its own IP address; it uses the server’s IP address. The program works with both SLIP and PPP clients. See IP.

SMTP

Simple Mail Transfer Protocol, a protocol for sending e-mail between e-mail servers. SMTP uses port 25.

SNMP

A protocol used for network monitoring. SNMP uses ports 161 and 162.

Sockets

When two computers connect to each other, they use their IP addresses and port numbers. The combination of an IP address and a port number is called a socket. See IP addresses and Ports.

SSH, Secure SHell

SSH is a system for secure, encrypted connections between two computers over a network. SSH uses one open and one secret key. In contrast to Kerberos, SSH does not use a central server for security. SSH uses port 22.

SSL

SSL stands for Secure Sockets Layer. The SSL protocol handles establishing of encrypted computer connections. Usually HTTP and WWW traffic is sent on SSL. HTTP on SSL is called HTTPS.

Static Routing

A fixed path for the contact between computers. With a static routing, traffic cannot be redirected to another path if the connection is broken. This would require dynamic routing, for example, with RIP.

Syslog

Syslog is a service for logging data. In UNIX, regular programs do not log any information; they send all data to a syslog server that saves data in a log file. One example is a web server that sends data over the computers that connects to the server and sends error messages for web pages that it could not locate. Messages to a syslog server can also be sent over the network. Syslog uses the UDP protocol. A syslog server listens to port 514 for syslog messages.

TCP protocol

TCP connects two computers and makes sure that all data gets through and in the right order. TCP uses IP. IP manages addresses and makes sure that data is sent out to the network. When TCP connects, it receives a response from the TCP protocol layer on the receiving end. The recipient sends a little data along with a confirmation that the sender's data arrived. When a connection is made, a confirmation is always sent with all data packets. This can be compared with Peter and Christy sending postcards and, along with their message, commenting that they received the other's postcard. TCP shortens this confirmation to ACK (acknowledgment).

You know if a TCP packet is a connection attempt if it does not have ACK.

TCP keeps track of connections for different services using different port numbers. See Ports.

UDP protocol

UDP does not make a connection. It examines data that comes from outside for accuracy, by checksums. This is like examining a postcard to ensure that it has not been torn up. UDP does not keep track of whether or not all data gets through or if it is in the right order; this is the job of the application. So the data does not have an ACK confirmation. Peter and Christy, sending postcards, have to keep track of their own postcards and Peter has to tell Christy the order in which they should be read. UDP keeps track of the contacts using port numbers, just like TCP.

UUCP

UNIX to UNIX Copy, an old protocol for copying files between two UNIX computers. This is sometimes used to send e-mail between two computers.

WWW, World Wide Web

The WWW is currently the best known Internet service. The World Wide Web consists of millions of documents that are interconnected all over the world. A document can contain text, pictures, sound, and even video sequences. The WWW is based on the client-server concept. This means that each document is in a database on a web server. The user runs a client program, such as Netscape or Internet Explorer, that connects to a server, which could be anywhere in the world, and request a document. This document is displayed on the user's screen and the user can use his client program to click on other documents to display them. WWW usually runs on the HTTP and HTTPS protocols, using ports 80 and 443, respectively.

X Window System

A window system that is used by several work stations. A similar window system is Open Windows. The X Window System and Open Windows uses port numbers starting at 6000 and upward for traffic to the work stations. It is a good idea to block ports 6000-6010 from incoming traffic from an insecure outside network.

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The zlib license

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Appendix F. Obtaining Support for Your 3Com Products

3Com offers product registration, case management, and repair services through eSupport.3com.com. You must have a user name and password to access these services, which are described in this appendix.

Register Your Product to Gain Service Benefits

To take advantage of warranty and other service benefits, you must first register your product at:

http://eSupport.3com.com/

3Com eSupport services are based on accounts that are created or that you are authorized to access.

Solve Problems Online

3Com offers these support tools:

- 3Com Knowledgebase - Helps you to troubleshoot 3Com products. This query-based interactive tool is located at:

  http://knowledgebase.3com.com/

  It contains thousands of technical solutions written by 3Com support engineers.

Purchase Extended Warranty and Professional Services

To enhance response times or extend your warranty benefits, you can purchase value-added services such as 24x7 telephone technical support, software upgrades, onsite assistance, or advanced hardware replacement.

Experienced engineers are available to manage your installation with minimal disruption to your network. Expert assessment and implementation services are offered to fill resource gaps and ensure the success of your networking projects. For more information on 3Com Extended Warranty and Professional Services, see:

http://www.3com.com/

Contact your authorized 3Com reseller or 3Com for additional product and support information. See the table of access numbers later in this appendix.

Access Software Downloads

You are entitled to *bug fix / maintenance releases* for the version of software that you initially purchased with your 3Com product. To obtain access to this software, you need to register your product and then use the Serial Number as your login. Restricted Software is available at:

http://eSupport.3com.com/

To obtain software releases that follow the software version that you originally purchased, 3Com recommends that you buy an Express or Guardian contract, a Software Upgrades contract, or an equivalent support contract from 3Com or your reseller. Support contracts that include software upgrades cover feature enhancements, incremental functionality, and bug fixes, but they do not include software that is released by 3Com as a separately ordered product. Separately orderable software releases and licenses are listed in the 3Com Price List and are available for purchase from your 3Com reseller.

Contact Us

3Com offers telephone, internet, and e-mail access to technical support and repair services. To access these services for your region, use the appropriate telephone number, URL, or e-mail address from the table in the next section.

Telephone Technical Support and Repair

To obtain telephone support as part of your warranty and other service benefits, you must first register your product at:

http://eSupport.3com.com/

When you contact 3Com for assistance, please have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision level
- Diagnostic error messages
- Details about recent configuration changes, if applicable

To send a product directly to 3Com for repair, you must first obtain a return materials authorization number (RMA). Products sent to 3Com without authorization numbers clearly marked on the outside of the package will be returned to the sender unopened, at the sender's expense. If your product is registered and under warranty, you can obtain an RMA number online at http://eSupport.3com.com/. First-time users must apply for a user name and password.

Telephone numbers are correct at the time of publication. Find a current directory of 3Com resources by region at:

http://csoweb4.3com.com/contactus/

Asia, Pacific Rim - Telephone Technical Support and Repair

Country	Telephone Number	Country	Telephone Number
Australia	1 800 678 515	Pakistan	+61 2 9937 5083
Hong Kong	800 933 486	Philippines	1235 61 266 2602 or 1800 1 888 9469
India	+61 2 9424 5179 or 000800 650 1111	P.R. of China	800 810 3033
Indonesia	001 803 61009	Singapore	800 6161 463
Japan	00531 616 439 or 03 5977 7991	S. Korea	080 333 3308
Malaysia	1800 801 777	Taiwan	00801 611 261
New Zealand	0800 446 398	Thailand	001 800 611 2000

You can also obtain support in this region at this e-mail address:

`<apr_technical_support@3com.com>`

Or request a return material authorization number (RMA) by FAX using this number: +61 2 9937 5048

Europe, Middle East, and Africa - Telephone Technical Support and Repair

From anywhere in these regions, call: +44 (0)1442 435529 From the following countries, call the appropriate number:

Country	Telephone Number	Country	Telephone Number
Austria	01 7956 7124	Luxembourg	342 0808128
Belgium	070 700 770	Netherlands	0900 777 7737
Denmark	7010 7289	Norway	815 33 047
Finland	01080 2783	Poland	00800 441 1357
France	0825 809 622	Portugal	707 200 123
Germany	01805 404 747	South Africa	0800 995 014
Hungary	06800 12813	Spain	9 021 60455
Ireland	01407 3387	Sweden	07711 14453
Israel	1800 945 3794	Switzerland	08488 50112

Country	Telephone Number	Country	Telephone Number
Italy	199 161346	U.K.	0870 909 3266

You can also obtain support in this region using this URL:

http://emea.3com.com/support/email.html

Latin America - Telephone Technical Support and Repair

Country	Telephone Number	Country	Telephone Number
Antigua	1 800 988 2112	Guatemala	AT&T +800 998 2112
Argentina	0 810 444 3COM	Haiti	57 1 657 0888
Aruba	1 800 998 2112	Honduras	AT&T +800 998 2112
Bahamas	1 800 998 2112	Jamaica	1 800 998 2112
Barbados	1 800 998 2112	Martinique	571 657 0888
Belize	52 5 201 0010	Mexico	01 800 849CARE
Bermuda	1 800 998 2112	Nicaragua	AT&T +800 998 2112
Bonaire	1 800 998 2112	Panama	AT&T +800 998 2112
Brazil	0800 13 3COM	Paraguay	54 11 4894 1888
Cayman	1 800 998 2112	Peru	AT&T +800 998 2112
Chile	AT&T +800 998 2112	Puerto Rico	1 800 998 2112
Colombia	AT&T +800 998 2112	Salvador	AT&T +800 998 2112
Costa Rica	AT&T +800 998 2112	Trinidad and Tobago	1 800 998 2112
Curacao	1 800 998 2112	Uruguay	AT&T +800 998 2112
Ecuador	AT&T +800 998 2112	Venezuela	AT&T +800 998 2112
Dominican Republic	AT&T +800 998 2112	Virgin Islands	57 1 657 0888

You can also obtain support in this region in the following ways:

- Spanish speakers, enter the URL: http://lat.3com.com/lat/support/form.html
- Portuguese speakers, enter the URL: http://lat.3com.com/br/support/form.html
- English speakers in Latin America, send e-mail to: <`lat_support_anc@3com.com`>

US and Canada - Telephone Technical Support and Repair

All locations:	Network Jacks; Wired or Wireless Network Interface Cards:	1 847-262-0070
	All other 3Com products:	1 800 876 3266

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